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ABSTRACT

A project, the Educators Information Technology System (EDITS), was designed to instruct teachers in data processing, broaden the knowledge of educators concerning the impact and utilization possibilities of computers, and allow teachers to develop techniques for using computer information technology in the classroom and in administration. Participants, representing diverse areas and levels of education, were provided with individualized instruction from a tutorial team, laboratory experiences, field trips, and lectures from professionals in the field. The curriculum included three phases: the first was designed to provide general background and programing, the second to instruct in techniques and applications, and the third to provide advanced applications to individual disciplines. From projects completed by participants during the program and from activities of the participants after completion of the program, project EDITS was judged to be successful in providing an effective technique for dissemination of computer information technology. (SP)

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COMPUTER INFORMATION TECHNOLOGY

ED0 39781

FINAL REPORT
Project No. 9-0184
Contract No. OEG-0-9-480184-2320 (10)

EDUCATORS INFORMATION TECHNOLOGY SYSTEM
Project EDITS

Patricia B. Brislin
InTech Corporation
116 South Main Street
Wilkes-Barre, Pa. 18701

March 1970

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

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EDUCATORS INFORMATION TECHNOLOGY SYSTEM

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Patricia B. Brislin

InTech Corporation
116 South Main Street
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PROJECT EDITS
SUMMARY

The Educators Information Technology System (EDITS) was implemented by InTech Corporation, Wilkes-Barre, Pennsylvania, for the purpose of broadening and strengthening the qualifications of educators in order to meet the nation's critical needs for expanded knowledge of electronic data processing. By providing a broad range of high quality training, responsive to changing education and manpower needs, Project EDITS was designed to accomplish the following objectives:

1. Instruct teachers in a comprehensive data processing program with the most recent equipment (third generation hardware and software), thereby developing trained educators capable of teaching data processing courses.

2. Broaden the knowledge of educators by making them aware of the impact of computers on their own lives and of existing utilization within their own professions.

3. Allow teachers to develop their own techniques that will implement computer information technology as an effective classroom tool and a potent administrative device within their school districts.

Data processing is one of the most rapidly expanding industries in the world. Each and every day, new solutions to age old problems are derived through data processing. The rapid escalation and new technological breakthroughs make possible still further expansion of the problem solving capabilities of data processing equipment. However, this dynamic growth has created a "people gap" that leaves the problem solving capabilities of computers widely untapped.

Since data processing has such a great impact on all of our lives and will have an even greater one, it is imperative that knowledge of the industry be more thoroughly explored. An awareness of its abilities and potential by diversified groups will open the spectrum of data processing even wider. Computer applications are not limited to banking, inventory control, or mathematical computations. They are assuming a prominent place in every aspect of modern living. This importance is growing phenomenally and we must meet the challenge.

Data processing manufacturers are conducting crash programs that develop manpower resources to support computer operations; however, this cannot begin to fulfill the need. We must now familiarize persons outside the industry with data processing in order to bridge the gap.

The most logical approach is to inform teachers of the tool at hand. They will better understand the relationship between the computer and the classroom; discover a new education resource; and, in turn, convey an understanding of data processing to the students. The teacher is the necessary link to expand the electronic age.

In February, 1967, the President's Science Advisory Committee issued a report on "Computers in Higher Education." The committee stated, "We believe that undergraduate college education without adequate computing is deficient education, just as undergraduate education without adequate library facilities would be deficient education. At present, deficiency in computing is wide-spread. We believe it to be vital to the national interest as well as to the welfare of the individual student to remedy this deficiency quickly."

The committee also stated "It is of the utmost importance to keep in mind that computing should not be thought of primarily as a new subject to be taught in addition to all the other important material now in the curriculum. Teachers who make use of computers in a wide variety of subjects have found that their material can be taught more rapidly, more thoroughly, and more meaningfully with the aid of computers.."

Most teachers entering the school systems today have not even been exposed to the existence of an industry which currently involves 60,000 computers, unlimited career opportunities, computer-assisted-instruction, and applications ranging from class scheduling to language translation. This industry is only 18 years old and future trends indicate even more dramatic events. Many local teachers have indicated an interest in data processing, but very few have the financial resources to pursue an education in this field. In addition, existing programs are directed to one or two disciplines, and do not serve the needs of educators in areas such as Social Science, History, or English.

Project EDITS was conceived as an innovation to overcome the problems involved in enabling professional educators in all disciplines to utilize the power of this dynamic technology.

Project EDITS instructed 60 educators from the upper Luzerne County area of Pennsylvania, in a comprehensive data processing education, consisting of 266 class hours including laboratory sessions, plus special tutorial sessions. It served to provide educators with an understanding of the most recent concepts in information processing, which each teacher now may utilize in his own discipline. Laboratory sessions included "hands-on" computer testing and additional test sessions performed on a "remote" basis. The training included fundamentals of data processing, computer programming techniques and applications, and advanced applications directly related to the educators' own disciplines.

This comprehensive education was provided by using a staff of professional data processing personnel, educators, and guest lecturers drawn from local industry, the academic profession, and data processing.

The learning situation was unique in that a team of professional data processing personnel taught an adult group of experienced teachers. In this environment a concentrated program was effected. The end result was a more comprehensive program than could be developed in the same period of time under ordinary class situations.

The entire program encompassed a 15 month period, and conformed to the schedule which follows:

Setup period - December 2, 1968 to February 2, 1969
Class Option 1 - February 3 to September 29, 1969
Class Option 2 - February 3 to June 27, 1969
September 2 to December 30, 1969
Final Reporting - Through March 31, 1970.

Recruiting of participants was verbally initiated at a meeting of the Superintendents of Luzerne County, Pennsylvania. Applications were provided to the superintendents for distribution throughout their districts. Correspondence, telephone conversations, and personal visits completed the recruiting process.

Participants, selected according to population of the school districts and number of applications per district and school, were representative of diverse areas of education, i.e. administration, guidance, the arts, sciences, and business. Educators within all levels of education were included, i.e. teachers, administrators and counselors.

To provide a program of maximum flexibility three class groups were formed each containing approximately 20 members. Two groups of participants attended a 3.5 hour class twice weekly for a total of seven class hours per week. The third group, unable to attend the evening sessions, attended a seven hour session each Saturday.

From its inception through its entirety, Project EDITS was marked with emphatic enthusiasm, supported by these facts: (1) Absenteeism was minimal, despite the long class hours and the total course length. Statistically, the overall attendance level during the period of February 3 to December 30, 1969 was 93.9%. (2) Twenty of the original participants withdrew prior to course conclusion. Of these, 17 withdrew for reasons totally unrelated to the course. Only one expressed dissatisfaction. (3) Significantly, upon course completion, none of the participants left his chosen field of education for that of data processing. Rather, they expressed an honest desire to expand and utilize their newly acquired knowledge within the classroom.

A unique feature of Project EDITS was a Tutorial Team which consisted of a guidance specialist and systems analysts. This team was established specifically for purposes of meeting with participants, both individually and on a group basis, and providing guidance and technical assistance upon demand. In this manner, an interacting system was established. That is, individualized attention was provided for EDITS participants, (a necessity with the voluminous technical material being presented) and information regarding participants' reactions to the project was accumulated and in turn utilized to improve the course. The Tutorial Team proved to be an extremely effective method for establishing communication and instruction.

Laboratory application was employed extensively throughout the entire course. During the programming phases, "hands-on" testing sessions were conducted at a local facility equipped with a third generation computer and the latest developments in peripherals. In addition, participants utilized the computer on a "remote" basis during the general and advanced applications presented in the course.

Periodically, throughout the program, guest lecturers were invited to address the EDITS participants. These consisted of professionals who served to present the nature of business, industry, education and government as related to data processing. Further, to effectively emphasize the concentrated material being offered throughout the course, several field trips were made by EDITS participants. Each correlated with the subject material being taught.

Much emphasis was placed on providing current information to program participants; this logically so, since computer technology is in a constant state of evolution and generates a tremendous amount of technical literature. As a result, updating of both the curriculum and material presented during the course of the project was a continual process.

Throughout the program teaching materials such as films, slides, overhead transparencies, glossaries, programmed instruction texts, programming manuals and supplementary "handouts" were utilized.

During the project, an evaluation of the EDITS curriculum was made by study area. This evaluation was assumed for the distinct purpose of aiding others who will be using the curriculum for similar endeavors. It appears in the EDITS Final Report. (Appendix H)
The topic order of the curriculum proved to be a logical flow with no revision necessary. However, exact data on class hours per topic is now available in the Final Report. (Appendix I)

The Data Processing Curriculum for Educators (U.S.O.E. project #8-0449) was used in this program. The curriculum includes the following subject areas:

PHASE ONE - GENERAL BACKGROUND AND PROGRAMMING

Evolution of Data Processing
Data Representation and Management
Concepts of Data Processing Hardware
Concepts of Data Processing Software
Computer Processing Techniques
Decision Making Techniques
COBOL Programming

PHASE TWO - TECHNIQUES AND APPLICATIONS

Data Processing Systems and Procedure Concepts
Integration of Systems and Programming
Practical Applications in Industry
Practical Applications in School Administration
Advanced Class Problem
Information Retrieval

PHASE THREE - ADVANCED APPLICATIONS TO INDIVIDUAL DISCIPLINES

Concepts of Computerized Instruction
Selection of a Computer
Data Processing Teaching Aids
Current Applications in Education
Individual Problem

Phase One of the curriculum provided the basis on which the class participant was able to build. Beginning with a brief history of data processing, it proceeds to acquaint the student with data preparation and computer hardware and software. The last section in Phase One embodies the COBOL programming language. COBOL is an acronym for COmmon Business Oriented Language, and allows the writing of statements in English that are later translated by the computer into its own language. COBOL was used since it is capable of solving a variety of problems and can be used on most third generation computers. In addition, it is easily learned and provides its own documentation. The successful completion of Phase One with its programming exercises was quite rewarding to the participants--the "gap" was bridged and an understanding of the fundamentals was acquired. No longer was the computer a mystery.

Phase Two dealt with the overall approach to utilizing computer technology as a problem solving tool. The information acquired in Phase One was now applied to the systems and procedures area to form a solid base in problem solution through the use of data processing equipment and techniques. Seven classroom problems were presented in the areas of government, industry, and school administration for the purpose of illustrating the practical application of data processing techniques to each of these areas. In each case, classroom work and discussions centered around systems design, hardware requirements, pertinent record data and corresponding field sizes and layouts, and variations of input/output methods. Sources and input data and problem objectives were provided for each application; after each phase of the problem was completed, the professional staff presented and discussed its own solution in relationship to each of the participant's solutions, resulting in an instant awareness by the student of the advantages or disadvantages of his solution in contrast to that suggested by the staff. The last several solutions by the class represented an immense increase in quality in comparison to the solutions derived from the first few problems. A significant result is evident in the fact that the participants now possessed an understanding of detailed application of data processing principles to specific problem areas.

The programming knowledge from Phase One and the problem-solving techniques of Phase Two were linked in Phase Three when the participant was required to look more closely at data processing within the field of education. Material was presented on Computer Assisted Instruction (CAI) and Computer Managed Instruction (CMI) for the purpose of showing the educators the power of these tools within specific fields of education. Other applications in educational areas were also explored.

A significant measure of the results derived from Project EDITS was obtained through an evaluation of two major laboratory projects completed individually by the participants during Phase Three. The first project, in the area of computer selection, required the participant to select one of three computers proposed by various vendors. Participants fully documented their choice, providing technical justification for their selection. Evaluation of this documentation revealed a high degree of understanding of selection concepts was attained by the participants. This knowledge will be especially useful both to the participant and his school district.

The second laboratory application required each participant to select a problem relative to his discipline which could be alleviated by means of data processing. The magnitude of this laboratory application is demonstrated by the fact that it comprised approximately 30 classroom hours plus additional time the student himself required to complete the problem. Upon submission and acceptance of his proposed problem, the participant designed all phases of the data processing applications, with the professional staff acting in an advisory and consulting capacity. The entire problem solution, including systems design, programming, and input/output layouts, was submitted to the staff for evaluation and review. The staff's evaluation led to the firm consensus that most projects submitted were of an extremely high degree of quality and could be implemented very easily in a realistic data processing application. These gratifying results render a concrete opinion that a detailed knowledge of data processing techniques now existed, when prior to enrollment in the course the participants had no more than a minimal amount of understanding of the subject. Moreover, participants were now in a position to assist their respective school districts in establishing data processing systems unique to meeting the demands of that school district. This theory was greatly substantiated by a follow-up study made on the 15 EDITS participants who completed the course in September, 1969. Thirteen are presently applying their acquired data processing knowledge within their own classrooms or school districts. Two are now accurately teaching a data processing course on the high school level; a third (a secondary level Spanish teacher) is teaching data processing on a part-time basis to some 35 educators. None of these three had been exposed to data processing prior to EDITS.

Project EDITS has broadened the knowledge of educators by making them aware of the "state of the art" its impact on their own lives, and its impact upon education. More specifically, the educator has a background in computer technology, which will enable him to keep abreast of technological advances and to solve problems within his field by utilizing data processing principles.

Based on the facts presented above, InTech Corporation recommends that:

1. The training of educators in the field of data processing be continued and expanded.
2. Data processing training be provided to segments of the population other than educators; for example, to students of all grade levels.
3. Development of shorter courses, tailored to the specialized needs and limited schedules of various groups of educators.
4. Development of teaching materials designed in a modular manner.

In summary, the completion of Project EDITS has demonstrated an effective technique for disseminating computer information technology. The "people gap," which presently limits the full power of this dynamic technology, has been significantly bridged by means of this invaluable program.

I. INTRODUCTION

Objectives

The Educators Information Technology System (EDITS) was initiated by InTech Corporation, Wilkes-Barre, Pennsylvania, for the purpose of broadening and strengthening the qualifications of educators in order to meet the nation's critical needs for expanded knowledge of electronic data processing. By providing a broad range of high quality training, responsive to changing education and manpower needs, Project EDITS was designed to accomplish the following objectives:

1. Instruct teachers in a comprehensive data processing program with the most recent equipment (third generation hardware and software), thereby developing trained educators capable of teaching data processing courses.
2. Broaden the knowledge of educators by making them aware of the impact of computers on their own lives and of existing utilization within their own professions.
3. Allow teachers to develop their own techniques that will implement computer information technology as an effective classroom tool and a potent administrative device within their school districts.

Background

Data processing is one of the most rapidly expanding industries in the world. Little over a year ago, at the time of the initiation of Project EDITS, there were approximately 40,000 computers installed in this country and 200,000 programmers. By the end of 1970 it is estimated that there will be 60,000 computers and a need for 650,000 programmers. Each and every day new solutions to age old problems are derived through data processing.

The rapid escalation and new technological breakthroughs make possible still further expansion of the problem solving capabilities of data processing equipment. However, this dynamic growth has created a "people gap" that leaves the potential capabilities of the computer widely untapped.

As far back as 1964, G. Truman Hunter stated that, "A student with a working life of 40-50 years ahead of him is facing an information explosion - with the accumulation of knowledge doubling every 10 years. He will be increasingly called upon to make use of the computer as a tool in nearly every field of endeavor. He needs to be enlightened ... not frightened by this strange and wonderful extension of the human mind: the computer." This can be said even more emphatically today.

Since data processing has such a great impact on all of our lives and will have an even greater one, it is imperative that knowledge of the industry be more thoroughly explored. An awareness of its abilities and potential by diversified groups will open the spectrum of data processing even wider. Computer applications are not limited to banking, inventory control, or mathematical computations. They are assuming a prominent place in every aspect of modern living. This importance is growing phenomenally and we must meet the challenge.

Data processing manufacturers are conducting crash programs that develop manpower resources to support computer operations; however, this cannot begin to fulfill the need. We must familiarize persons outside of the industry with data processing in order to bridge the gap.

The most logical approach is to inform teachers of the new tool provided by computer technology. They will then better understand the relationship between the computer and the classroom; discover a new education resource; and, in turn, convey an understanding of data processing to the student. The teacher is the necessary link to expand the electronic age.

In February, 1967, the President's Science Advisory Committee issued a report on " Computers in Higher Education." The committee stated, "We believe that undergraduate college education without adequate computing is deficient education, just as undergraduate education without adequate library facilities would be deficient education. At present, deficiency in computing is wide-spread. We believe it to be vital to the national interest as well as to the welfare of the individual student to remedy this deficiency quickly."

The committee also stated "It is of the utmost importance to keep in mind that computing should not be thought of primarily as a new subject to be taught in addition to all the other important material now in the curriculum. Teachers who make use of computers in a wide variety of subjects have found that their material can be taught more rapidly, more thoroughly, and more meaningfully with the aid of computers..."

The November, 1967, publication of American Education, published by the U.S. Office of Education, stressed the importance of computers to society and urged that high school students be exposed to computers. In this issue R. Louis Bright, Ph.D. formerly with Westinghouse Research Laboratories, Associate Commissioner for Research, Office of Education, and now affiliated with Baylor University, Waco, Texas, presented an article titled, "The Time is Now". Noting the President's Science Advisory Committee's report, he said he would carry this one step further. "The high school which ignores the impact of computers is just as obsolete."

Although computers have already had an impact on our school systems, all too often educators are found unprepared. Within the State of Pennsylvania alone, vendor information (IBM, HONEYWELL, G.E., NCR, RCA, BURROUGHS) reveals that at least 117 computers are being installed in public high schools, public technical schools, and state and community colleges. But the Pennsylvania Department of Public Instruction estimated that only 25 to 50 teachers (out of 80,000) have a working knowledge of data processing. Most of the teachers entering the school systems today have not even been exposed to an industry which currently involves more than 40,000 computers, unlimited career opportunities, computer-assisted instruction, and applications ranging from class scheduling to language translation.

Computers are being purchased for the schools by people who have no understanding of the differences existing in hardware systems; therefore, the student graduates are unprepared to meet the needs of the data processing installations in the surrounding area. These situations are not unusual; few schools have been able to keep abreast of the data processing industry. In most schools, data processing courses simply do not exist. In school systems where computers do exist, teachers and administrators are not aware of the potential of their systems.

Many local teachers have indicated an interest in data processing, but very few have the financial resources to pursue an education in this field. In addition, existing programs are inadequate for the needs of most educators since they are directed toward only one or two disciplines such as mathematics or business. This is a nationwide problem which must be solved. Our teachers must be trained immediately, enabling them to provide their students with the knowledge necessary for participation in our electronic age.

Project EDITS was conceived as an innovation to overcome these problems and thus enable professional educators of all disciplines to utilize the power of this dynamic technology.

Methodology

EDITS was designed to instruct 60 educators in a comprehensive data processing course consisting of 266 class hours including laboratory sessions, "hands-on" computer experience, special tutorial sessions, guest lecturers, and field trips. Participants were selected from numerous areas of education such as administration, guidance, the arts, sciences, and business. The course content was tailored for the special needs of educators containing sections on evolution of EDP, hardware and software concepts, programming, system analysis and design, general applications, and advanced applications in education. The course included opportunities for the individual participants to develop their own techniques for applying computer technology in their professional areas.

The EDITS project extended from December 2, 1968 through March of 1970. The first two months were devoted to course planning and selection of participants. Following this period, classes were held from February 3, 1969 to December 30, 1969. The last stage, that of final reporting, was completed on March 31, 1970.

II. MAJOR ACTIVITIES AND ACCOMPLISHMENTS

Project Initiation

A two month period, December 2, 1968 through February 2, 1969, was utilized in initiating Project EDITS. This setup period involved recruiting, selection and orientation of participants.

Recruiting of Participants

Recruiting was initiated at the monthly Superintendents meeting of the Luzerne County Board of Education. Mrs. Patricia Brislin, Project Director, and Dr. Ellis W. Roberts, Chief Consultant, introduced Project EDITS and announced its availability to 60 area educators. The announcement was received with exceptional positive reaction. Correspondence with district superintendents and secondary school principals in the 13 school districts of upper Luzerne County outlined the course aims and included announcements to be posted in each school. Applications were provided for distribution throughout the districts. (See Appendix M) During this period, Mrs. Ellen McLoughlin, Guidance Counselor, Dr. Roberts and Mrs. Brislin were available to answer any questions from interested educators, both personally and by telephone.

Eighty-three applications were received. Twelve districts responded:

Ashley-Sugar Notch*, Ashley, Pa. 18706
Center Luzerne County Joint, Mountaintop, Pa. 18707
Dallas School District, Dallas, Pa. 18612
Freeland High School, Freeland, Pa. 18224

*The Ashley-Sugar Notch School District is the only district contacted that did not participate.

Greater Nanticoke Area, Nanticoke, Pa. 18634
Hanover Township, Wilkes-Barre, Pa. 18702
Lake-Lehman Joint, Lehman, Pa. 18627
Northwest Area School District, Shickshinny, Pa. 18655
Pittston Area School District, Pittston, Pa. 18640
Plains Township-Laflin Borough Joint, Plains, Pa. 18705
West Side Area Vocational School, Pringle, Pa. 18704
Wilkes-Barre City School District, Wilkes-Barre, Pa. 18702
Wyoming Area School District, Kingston, Pa. 18704

Orientation of Participants

An orientation meeting for all applicants was held prior to the initial EDITS class. This meeting was also used to aid in setting up tentative class schedules. Following the orientation meeting, 13 of the original applicants withdrew. Reasons for pre-course withdrawal were given as follows:

1. Extensive course hours per week - five applicants.
2. No guaranteed accreditation - three applicants
3. Overcommitted - two applicants
4. Scheduling conflict - three applicants.

Except for those five applicants who felt the weekly course hours were too long, the remaining eight applicants wished to be contacted should the course be repeated.

Selection of Participants

Since the course had been oversubscribed, final selection of applicants was made according to population of school district and number of applicants per district and school. As a result of this process

10 additional applicants were eliminated in order to limit the size of the classes and conform to the proposal.

Statistics on Participants

Statistics on the 60 selected EDITS participants are as follows:

Educational Background

Degrees	Number	
M.S.	13(	
M.A.	6(	20
M.E.	1(	
B.S.	25(	
B.A.	9(	34
Standard	1	
Credits	5	
Total	60	

Colleges Represented by Participants

Degrees		
Bloomsburg State	Pa.	7
Bucknell	Pa.	5
Carnegie Tech	Pa.	1
Columbia	N.Y.	2
King's	Pa.	6
Lafayette	Pa.	1
Mansfield State	Pa.	1
Marywood	Pa.	1
Millersville State	Pa.	1
Misericordia	Pa.	8
New York University	N.Y.	4
Penn State	Pa.	5
Scranton University	Pa.	2
Susquehanna	Pa.	1
Temple University	Pa.	3
Wilkes	Pa.	7

Years of Teaching Experience

Experience varied from one year to 35

years. Most participants were in the first 10 years of teaching.

1 through 10 years	40 participants
11 through 20 years	10 "
21 through 30 years	5 "
31 through 35 years	5 "

Disciplines

Business Education	19	participants
Mathematics	9	"
Industrial Arts (Voc. Tech).	6	"
Science	7	"
English	3	"
Elementary	3	"
Data Processing	2	"
Social Studies	2	"
Music	1	"
History	1	"
French	1	"
Spanish	1	"
Agriculture	1	"
Librarian	1	"
School Psychologist	1	"
Supervisor (Jr.-Sr. H.S.)	1	"
Superintendent of Elementary Education Luzerne County	1	"
	60	

Experience in Data Processing

1. None - 56 participants.
2. Four participants were initially teaching data processing, two in addition to other courses.

Exposure to Data Processing

1. Work Experience - four participants
   a. Key punch Operator - one participant
   b. Knowledge of Computer Circuitry - two participants

    - c. Assisted in installing an automated system for inventory control and billing - one participant
2. Course in Data Processing - four participants
    - a. Introduction to Data Processing - three participants
    - b. ForTran - two participants

Reasons Given for Taking the EDITS Course

1. Interest in new techniques; Develop diverse background to upgrade teaching - fifty-three participants.
2. Interested in teaching Data Processing - three participants
3. Already teaching Data Processing - four participants.

Participants

Male	Female
42	18

Total of 60 participants

Auditors

There was a total of seven people, educators from local colleges, who attended the course as auditors.

School	Number Attending
King's College	3
Misericordia College	3
Wilkes-Barre Business College	1

Project Schedule

Three phases existed in project EDITS: setup, classes and final reporting. The initial setup phase, consisting of counseling, applicant evaluation, selection and planning, began on December 2, 1968 and continued through February 2, 1969. The class phase, in which two course schedule options were available to the participants, extended from February 3, 1969 to December 30, 1969. The last stage, that of final reporting, was completed on March 31, 1970.

Facilities

Classroom facilities were donated by King's College, Wilkes-Barre, Pennsylvania. This location proved to be convenient since the selected participants lived within an acceptable radious from the college.

Class Schedule

To provide a program of maximum flexibility, the participants were given an option to choose between evening or Saturday classes. The classes consisted of 3.5 hours twice each week (Monday-Wednesday or Tuesday-Thursday) or a single 7 hour session (Saturday). Each group contained approximately twenty participants, with some variation due to their scheduling difficulties.

Course Schedule

The proposed course schedule conformed closely to the normal school year. That is, the classes were to extend from February thru June, with a summer vacation, resuming in the fall from September thru December. However, several participants expressed interest in continuing the course throughout the summer, so they would be able to attend graduate school in the fall.

Summer Session

Since there were fifteen participants who were interested in summer classes, it was determined to offer a course of concentrated instruction so they would be able to complete the course by the end of September. Classes were held three evenings each week (3.5 hours each session) and ended September 29, 1969.

Primarily due to the lack of airconditioning in the King's College classroom, classes for this group were held at the InTech Office which was temporarily equipped with all the necessary classroom aids.

Fall Session

On September 2, 1969 classes resumed at King's College for those participants who had elected to take a summer recess. Scheduling adjustments enabled all returning participants to attend evening class sessions scheduled in the same manner as during the spring term. Therefore, the single seven hour class session was eliminated and two groups were formed.

Due to the summer session, we were able to accommodate several additional administrators and teachers in the fall session during classes of special interest, i.e. CAI - CMI, Selection of a Computer, Data Processing Teaching Aids, and Applications in Education.

Combination Classes

Late in October, 1969, it was deemed feasible to combine both groups into one single class. In addition to the instructor, two systems analysts were present in the class at all times, thus providing more individualized attention than could be achieved with the traditional single instructor - no aide situation. Subject material presented during this final phase of the course contained much laboratory work which made team teaching particularly appropriate.

Instructors

Utilization of instructors throughout the course was as follows:

1. Spring session (February 3, 1969 to June 27, 1969) - Three instructors, one for each class, were required.

2. Summer session (July 7 to September 29, 1969) - Two instructors were utilized primarily on a team teaching basis.
3. Fall session (September 2 to December 30, 1969) - Two instructors were initially required. The effected combination of classes in late October resulted in one instructor being utilized together with two systems analysts.

Curriculum Content

The curriculum used for the project was the *Data Processing Curriculum for Educators* developed under Project reference #8-0449 U.S.O.E. Study areas were presented in the curriculum in three major phases. These are listed below.

Study Area

Phase I - General Background & Programming
- Evolution of Data Processing
- Data Representation and Management
- Concepts of Data Processing Hardware
- Concepts of Data Processing Software
- Computer Processing Techniques
- COBOL Programming

Phase II - Techniques and Applications
- Data Processing Systems and Procedure Concepts
- Integration of Systems and Programming
- Practical Applications in Industry
- Practical Applications in School Administration
- Advanced Class Problem
- Information Retrieval

Phase III - Advanced Applications to Individual Disciplines
Concepts of CAI-CMI
Selection of a Computer
Data Processing Teaching Aids
Current Applications in Education
Individual Problem

The actual class hours utilized during the program in each study area are provided in Appendix I.

At the conclusion of the spring term, all participants had completed Phase I and the study areas of Data Processing Systems and Procedure Concepts and Integration of Systems and Programming in Phase II of the curriculum. The remainder of the curriculum was covered in the summer and fall sessions.

Tutorial Guidance

A tutorial-guidance team consisting of a guidance specialist and systems analysts was established for the purpose of meeting with all participants both individually and on a group basis, and of providing guidance and assistance on demand.

This method proved to be extremely effective both to participants and the instructors in that there existed a constant two-way transfer of information between the tutorial team and the instructor.

The meetings served to provide all individuals with a true sense of participation, enabling them to discuss problems and evaluate their progress. In addition, these meetings provided excellent information regarding the individual's reaction to the project.

Information accumulated by the tutorial-guidance team was discussed at staff meetings, and used for determining the participants needs in the areas of course material and presentation.

The tutorial-guidance team was utilized in the three environmental areas described below:

1. In-School Assistance

Individual. Initial interviews were specifically aimed at getting to know the individual participant. The discussion centered on why the course was being taken, how the person felt about the course and how it would be of value to them in a classroom situation. The initial interviews and tutoring sessions were held in the school of the participant. Scheduling of these sessions was arranged to coincide with their free periods. Written reports of all individual interviews were filed for reference.

Group. After the interviews had been completed, classes had progressed to a point in the curriculum where the need was primarily for supplemental instruction and technical assistance. At this point in the course, the problem areas involved the technicalities of programming. Since a specific problem was quite often common to several participants the next round of tutorial sessions was conducted on a group basis, whenever possible. Thus by providing technical tutoring to small groups the maximum in individualized instruction was achieved.

2. In-House Assistance

During Phase II of the course problem areas were of a continuing technical nature. Since meaningful technical assistance is time consuming, the limited free time of any educator-participant during school hours inhibited the tutorial sessions. Therefore, the ideal situation was effected by participants visiting the InTech office on an "as required" basis. More effective help was brought about by this method since the participant was not bound by the "bell" - and the end of his free period. This in-house assistance was provided at any time, on an individual or group basis and the participants readily availed themselves of it.

3. In-Class Assistance

During the COBOL programming section of the course and the Advanced Class Problem thru Applications in Education, an instructor and a systems analyst were present in each classroom in order to provide immediate technical assistance. During the participant's Individual Problem (the climax of the course) an additional systems analyst attended the classes. Each participant was assigned to a specific member of the team for guidance and direction in the implementation and design of his project.

This individualized attention was instrumental in providing for the continued enthusiasm of the participants.

Computer Utilization

During the COBOL programming phase of the curriculum, "hands-on" testing sessions were conducted at a local facility equipped with a Univac-9300 computer (third generation equipment). Here all participants successfully coded, compiled, and debugged two programs. In all, a minimum of seven hours "hands-on" programming experience was provided each participant.

The first program, the Indian Problem, was a simple problem which involved compound interest. Using the $24.00 received by the American Indians from the sale of Manhattan, calculations were made on how much the Indians would have in 1969 if they had banked the money at 3% interest compounded annually. Answers were provided on a yearly basis starting from 1627. Input data was internally specified, output was printed. This simple, yet interesting, problem provided an ideal initiation to the computer.

The second program dealt with the conversion and updating of a customer sales system. It was a more advanced program than the Indian Problem. The class members worked with card input data and both tape and printed output.

In addition to the "hands-on" experience related above, several programs were presented to the classes to be written and run on an optional basis, as many participants were interested in developing additional programs. These were run "remotely" as required. Upon successful completion, suggested solutions of these programs were given to all members.

Prior to acceptance of any program, the instructor or systems analyst and the participant reviewed the submitted program. During this review, possible problems were uncovered and eliminated. Thorough "disk checking" of programs became a habit.

All participants again utilized the computer on a "remote" basis during the Advanced Class Problem in Phase II of the curriculum. Here, they coded and debugged a mark analysis program which required analysis of distribution of grades for each teacher in a school district. Each program was run to successful completion.

During Phase III of the course, those who chose to include programs within their Individual Problem again had the opportunity to utilize the computer. As in previous problems, the participant was required to code, debug and produce a successful end product. Remote testing was utilized. Time requirements varied with the complexity of the system and testing of the final programs was not completed until February, 1970.

Laboratory Application

Laboratory application was employed extensively throughout the curriculum. As can be expected, certain areas were heavily weighted with in-class laboratory application. These are described below.

COBOL Programming. By its very nature, extensive laboratory application was demanded in this area for maximum effectiveness. Therefore approximately 50% of the time spent in the programming area was utilized in coding, compiling, and debugging the various problems. Since these programs were discussed in Computer Utilization above, they will not be elaborated on here.

Integration of Systems and Programming. Following the theoretical study of systems analysis and design, a case study of general interest to the participants was presented, a Voter Registration System (conversion, pre-election, post-election). Approximately 50% of class time in this unit was devoted to laboratory application. Once the specifications of the system were given, the participants were required to design a feasible system. This effort included general system flow charts, file specifications, record and report design, and detailed program flowcharts.

Advanced Class Problem. Approximately 75% of these classes are utilized in laboratory application. During these sessions the participants worked in groups of three, with a team of three instructors available for aid and consultation. The problem was an extension of a grade reporting system previously encountered in Applications in School Administration. It was the responsibility of each group to analyze, design and implement the system. They were required to design both the general system and the various sub-systems.

As a part of the implementation phase, each group was required to code and debug a mark analysis program required by the system.

Finalization required each participant to document the specific system designed by his group. Documentation entailed providing complete system description: general flow; hardware requirements; processing intervals;

statistics on the physical system; description of file creation and maintenance; handling of exceptions; required controls; narratives on each major program utilized; and recommendations for future utilization of the system.

The Advanced Class Problem enabled each participant to apply his data processing knowledge in a realistic situation.

Selection of a Computer. Though extensive laboratory application was not necessary, that involvement which did exist made extensive use of the knowledge previously obtained in the course. Having been provided with the important facts, theories, and guidelines to be used in computer selection, proposals from three competing vendors were distributed. Participants were required to evaluate each proposal with regard to the immediate and future needs of the school. The individual was required to document his selection, and provide technical justification for his final choice, together with reasons for disqualification of those not selected. This documentation was checked for validity by the members of the staff. (See Appendix E)

Individual Problem. This phase of the course consisted of total laboratory application. Each participant selected a problem related to his discipline which could be alleviated by data processing. One month prior to beginning his individual project, each participant was to submit a proposal describing his selected problem. A team of staff members then examined each selection in order to determine its feasibility. The complexity of the selected project, the participant's capability and equipment limitations were taken into consideration. Most of the problems were accepted and approved as presented. Based on mutual agreement, in a few cases, either the projects were refined or new projects were selected. Two weeks following the initial proposal, each participant submitted a detailed elaboration of his problem. This included: problem definition, purpose of the study, and methodology planned for implementation. It served to insure that no confusion existed in regard to the selected problem, and as a control in order to assure that all the participants were taking the most direct approach to their problem implementation.

At the actual initiation of this study unit, detailed guidelines and specifications were given to each participant. The guidelines included requirements to be fulfilled by each participant in his problem selection, implementation, and documentation. (See Appendix F).

During the Individual Problem, two systems analysts, in addition to the instructor, were provided. Each participant was assigned to a specific systems analyst for guidance and consultation during the entire course of his final project.

Participants were required to develop, implement, and completely document their final project. Documentation was to include a narrative specifying what the project would accomplish, a method of approach, a summary evaluation of the project, and a general statement of the proposed use of the end product. In addition, each participant was required to include general system flowcharts, and all record and report layouts. Writing of error free programs was encouraged, but optional.

At the conclusion of the Individual Problem, staff members evaluated the final projects. They were viewed from a technical standpoint, taking into consideration the purpose of the course; i.e., to engender a general but comprehensive education in the field of data processing, and an understanding and working capability of data processing as a tool to be applied to the participant's particular discipline.

A graded result was established and constituted the major percentage of the final grade.

Guest Lecturers

Periodically, throughout the program, guest lecturers were invited to address the EDITS participants. These consisted of professionals who served to present the nature of business, industry, education and government as related to data processing. The lectures correlated with the material being presented in the classroom. Each lecture is briefly described below. The professions representative of the lecturer are indicated.

1. Dr. R. Louis Bright - Education, Government, Engineering.

On March 24, 1969, Dr. R. Louis Bright, distinguished inter-disciplinary professor at Baylor University, spoke to the EDITS participants on the impact of the computer in the field of education.

Dr. Bright cited several examples of how the teachers will be relieved of many of their record keeping functions, thereby enabling them to give more attention to the specific needs of their students.

Two major applications, Computer Managed Instruction and Computer Assisted Instruction, and their applications in the classroom were examined. Dr. Bright pointed out that the computer's effectiveness is only as useful as the program within which it operates. Therefore, the quality and efficiency of these programs are ultimately the responsibility of the educators.

The address was followed by a question and answer period. In addition, the participants were able to speak with Dr. Bright on an individual basis after the meeting. They were all extremely pleased to have had the opportunity to hear and meet a man with so much working experience in the combined fields of computer technology and education.

2. Mr. Edward McLaughlin - Government, Utilities.

In June, Mr. Edward McLaughlin, Business Manager for the Wyoming Valley Sanitary Authority, addressed the EDITS participants on the subject of Computer Systems and the Systems Analyst. The talk was scheduled to coincide with the conclusion of Integration of Systems and Programming

Mr. McLaughlin defined the term "system" and, through the use of basic examples, pointed out that each participant was in a sense, a systems analyst. He emphasized the basic similarities which exist in systems of all disciplines. The personal characteristics required of a systems analyst were enumerated.

An informal question-answer period followed the address. Mr. McLaughlin had been involved with designing a voter registration system, one quite similar to the system presented in class. He was able to answer specific questions allowing greater appreciation for the scope and depth of this task. Of further interest to the educators, he announced the implementation of an on-line attendence accounting system in the Wilkes-Barre City School District which would involve many of them.

Previously, Mr. McLaughlin was associated with Honeywell Corporation as a systems analyst in the education division, responsible for the installation of computers for the Australian Government.

3. Mr. Thomas Lasky - Insurance Accounting.

In conjunction with the topic Data Processing Applications in Industry, Mr. Thomas Lasky, Manager of the Blue Cross Data Processing Center, addressed the EDITS participants at the Blue Cross Computer facility in Wilkes-Barre, Pennsylvania. He described all phases of the billing system utilized by the organization. The system design was discussed while the computer calculated and printed the billing notices.

In addition, Mr. Lasky described and demonstrated technical factors such as record designs, file organization, sorting characteristics used in the system, program overlays, and supervisor control.

Following the address, an informal question and answer period was held both at the computer facility and later in the classroom. Concepts demonstrated were later correlated with the industrial application being presented in the classroom.

4. Mr. Richard D. Bridle - Economics.

As a supplement to the study of Information Retrieval, all EDITS participants gathered at the office of Bache and Company, Wilkes-Barre, Pennsylvania. Here Mr. Richard G. Bridle informed participants of the operating characteristics of a major international information retrieval system which is currently being used by the firm.

Mr. Bridle explained how, by means of an on-line terminal connected to this gigantic information system, the brokerage firm retrieves stock information instantaneously. Participants' queries regarding stock information of interest were answered immediately via the terminal. A lively question and answer period ensued.

5. Dr. Daniel Vitello, Mr. Aaron Henkin - Computer Assisted Instruction, Systems Engineers.

During the unit on Computer-Assisted and Computer-Managed Instruction, RCA

Instructional Services provided EDITS participants with a movie, lecture and live demonstration on RCA's Spectra 70 instructional system. The presentation was at King's College using a typewriter terminal connected to a computer in Massachusetts. Two seventh-grade pupils were available for the demonstration. The lecture by Mr. Vitello included a description of the hardware for instructional utilization, the reaction of students to computerized instruction, and evaluation of the results of this innovative method of instruction. A discussion period followed.

6. Mrs. Miriam Sable - Music, Education.

Prior to undertaking their Individual Problem, the participants of the fall session were addressed by Mrs. Miriam Sable, who teaches music in the Wilkes-Barre City Schools. A summer participant, Mrs. Sable explained her completed project to the group. This project was a CAI system for teaching Music Theory. She introduced the project, clearly stated its purpose, and provided the approach she had taken in implementing her system. The practicability of the system was demonstrated as she progressed through the manually depicted CAI frames. The need for the system was emphasized as she cited the many instances in which she would be able to apply it when the hardware is available in her district. She revealed her plan to use the system as a programmed instruction course in her own classes until CAI equipment would become available. Her enthusiasm was contagious and provided a proper incentive to these educators who were about to undertake their individual projects.

Field Trips

To effectively supplement the concentrated material offered throughout the course, several field trips were made by EDITS participants. Each was correlated with subject material being taught at the time.

King's College. During the first week of the program, a tour of King's College data processing center was made. This was conducted during the initial study area, Evolution of Data Processing, and served to familiarize the participants with equipment utilized in the profession. Many of the participants had never previously been exposed to a computer.

Demonstrated during the course of the tour were: (1) supportive devices such as the keypunch, verifier, sorter and collator; (2) peripheral equipment examples of which were the card reader/punch, console typewriter, and random access devices; (3) the central processing unit, a second generation IBM 1620 computer. In addition, an IBM 402, a unit record device, was demonstrated. Thus, participants were familiarized with the evolution of data processing hardware, from the unit record to the computer era.

Comline Data Services. In conjunction with the material presented on Concepts of Data Processing Hardware, a trip was made to a new time-sharing service bureau located in downtown Wilkes-Barre. This tour included demonstrations of communication devices (data stations, video display unit); a third-generation central processing unit, the Univac 9300; and peripheral devices such as magnetic tape units, and the card reader/punch.

Luzerne County Data Processing Center. The next tour was conducted during the unit on Concepts of Computer Software to solidify in the minds of the participants, material presented on the concepts of software and hardware. Participants spent more than two hours on site. The equipment utilized was a Honeywell Series 200 computer with 4 tape drives, a card reader/punch, and printer. Several operations were performed and correlated to software concepts explained in class. The following operations were observed: assemblies, (included were deliberate errors to be detected by the assembler); the utilization of a sort program employing card input and tape output; and the use of utility programs for repetitious procedures, i.e. copying tapes, dumping core, etc.

Blue Cross Data Processing Center. The unit on Practical Applications in Industry was supplemented with this field trip conducted by Mr. Thomas Lasky, manager of the center. The hardware configuration consisted of an IBM 360 computer, having 65K core storage capacity, two tape units, six disk units, a card reader/punch and printer. A complete billing system was presented to the participants, with various jobs run on the computer. A full system run was performed, from load via the card reader, through program processing, utilizing tape and disk simultaneously, to final printed output. During the demonstration, all phases of the system were thoroughly explained. The emphatic point of the tour was the utilization of disk. The concepts of sorting, table lookup, disk access, random and sequential file organization, supervisor control, program overlays and system operation, all previously covered in theory, were not emphasized during the demonstration.

Comline Data Services. This field trip correlating with the unit on Data Processing Teaching Aids, was arranged for the purpose of demonstrating the many available teaching aids which can be used with the computer. These ranged from simple game playing activities designed to stimulate interest in the computer, to complex scheduling of large scale projects.

Several members of the class played Tic-Tac-Toe with the computer, and were interested in the variety of messages displayed throughout the game. This was designed to illustrate a simple technique for introducing a novice to the computer. More complex activities were demonstrated, including scheduling of a large-scale building project, beginning with demolition of an old structure and concluding with completion of construction. The Critical Path Method (CPM) was used in scheduling. Class participants expressed interest in the CPM program and discussed potential applications, including CPM class scheduling.

Curriculum Updating

Since computer technology is in a constant state of evolution and generates a tremendous amount of technical literature, much emphasis was placed on providing the most recent information to program participants. As a result, extensive effort was put into keeping abreast of current research. To this end an information research team was established and addition of current material to the curriculum was a continual process.

Current Information Research. Although one staff member was fully engaged in the constant review of pertinent magazines, manuals and books, the voluminous literature deemed it necessary to allocate the reading of various professional periodicals and publications to additional staff members. It was also determined that this cooperative effort would be more effective if the Information Officer made the assignments and was responsible for their completion. Areas of information pertinent to the curriculum which needed to be researched, were brought to the attention of the Information Officer at weekly staff meetings. She, in turn, selected that person who was most capable of obtaining this particular information. In this manner, the staff worked efficiently and effort was not duplicated. All materials researched and found to be of interest to EDITS participants were distributed thru the information officer. Articles of immediate interest were sent directly to the appropriate member of the staff.

Curriculum Changes. The extensive research, which was done for each class session, oftentimes led to the inclusion of items of general interest to the educators for the current study area, elaboration of remaining study areas, and resulted in several topics being added to the curriculum.

Computer Managed Instruction (CMI). CMI involves using the computer to monitor the education of students. With this system, the computer is used to grade the student's tests, assign reading material, and keep track of the exact progress and problem areas of the student. Unlike Computer Assisted Instruction (CAI), CMI does not actually involve teaching the student, but is a management tool for instruction.

After further exploration of CMI and its impact upon education, a full staff meeting was held on April 9, 1969 to discuss plans for incorporating CMI into the EDITS curriculum.

Since the curriculum of EDITS is flexible, it was determined that CMI would be included in the basic format. Thus CMI became an extension of the existing section on CAI. The expansion of this section to include CMI enabled a comparison to be made between these two methods of computer use in the field of education. Thus resulted a more comprehensive unit covering all current uses of the computer as an aid in student instruction.

Another curriculum conference was held in June for the purpose of reviewing the new research. At this time it was determined that sophisticated computer selection techniques such as SCERT be added to the unit on Selection of a Computer. Also added to this unit was a discussion of the current "unbundling" policy of several computer manufacturers, a new development in the EDP field, which has direct bearing on selection.

Planning and Evaluation

In order to coordinate the various program activities as they occurred and to insure both maximum quality in course materials presented and maximum effectiveness in methods used, periodic staff meetings and evaluation forms used by the instructors were employed during the course of the program.

Staff meetings. Weekly staff meetings were held in order to assist the staff in gauging the progress of the course and determining the needs of the participants. The staff meetings encompassed the following activities:

The instructors discussed the course material presented and determined the strong or weak points of the lesson plans. When necessary, changes were made so that a more meaningful lesson plan was produced. Common problems were aired and methods of alleviating them were determined.

The Information Officer was informed of the technical articles which had been read by staff members and of the areas which were of current interest to the instructors. Future needs were discussed so that useful material would be available when needed. This procedure was quite effective and benefited everyone involved in the EDITS project.

The Tutorial-Guidance Team activities were reported by two methods to other members of the staff. After the team met with a participant, or a group of participants, reports were made to the specific instructors involved. In addition, the team's activities were reviewed and specific areas of concern were discussed during staff meetings.

The remedial work accomplished by the systems analyst was presented and the participants' progress was then reviewed.

Class Evaluation Forms. Class evaluation forms were utilized by each instructor. (See Appendix O.) Information thus provided by the instructor supplied staff members with such facts as: class material intended to be covered and material actually covered, audio-visual aids used, laboratory exercises applied, and specific comments. Instructor's comments indicated such evaluating factors as: strong and/or weak course material areas, effectiveness of audio-visual aids used, applicability and effectiveness of laboratory applications, participants' needs and problem areas, and actual time required to cover each specific curriculum topic. These forms proved invaluable to total program coordination and evaluation. The in-class experience of the instructors as provided on these forms, oftentimes provided valid reasons for curriculum modification.

Teaching Materials

Teaching materials used throughout the program were in the form of films, slides, overhead transparencies, glossaries, programmed instruction texts, programming texts, and supplementary "handouts." Due to the fact that problems were encountered in obtaining adequate films and an appropriate course text, the approach taken throughout the program was to overcome this deficiency by providing participants with comprehensive supplementary "handouts" and by the in-house development of appropriate overhead transparencies.

Attached is a complete list of supplementary teaching materials used throughout the program. (See Appendix C). Listed items are correlated with the curriculum topic in which they were used.

In order to aid the participants in keeping abreast of the ever changing events of computer systems and the data processing industry, a one-year subscription to Datamation was provided for each participant.

Credits

Classroom facilities for the EDITS course were donated by King's College, Wilkes-Barre, Pennsylvania, as a community service. King's is a liberal arts college which presently offers an undergraduate degree in Data Processing.

From the time of its initiation on February 3, 1969, members of the Data Processing Department of the college expressed much interest in the progress of the EDITS course. As a result, in May, 1969, the Chairman of the Department of Data Processing, Angelo DeCesaris, after using the accepted monitoring and evaluation standards, made a formal request for accreditation of the course to the Academic Council of King's College. The advanced techniques and methods, developed by the research team and applied by the instructors for the project, proved so meritorious in scope and depth that 11 undergraduate credits were offered to each of the participants who finished the course.

Decision on the number of credits was reached by correlating the EDITS course content to three data processing courses offered by the college. The credits were offered on an optional basis to the participants, subject to the following conditions:

1. That any changes in the teaching staff of project EDITS be subject to review by the Department of Data Processing of King's College.
2. That grades compatible with the grading system currently in use at King's College would be assigned to the participants by the teaching staff of project EDITS.
3. That a fee of $75.00 be charged for each participant granted credit, to cover the administration costs. This equaled less than $7.00 per credit.

Follow-up Study

In December, 1969, a follow-up study was completed on the 15 EDITS participants who attended the summer session and completed the course on September 29, 1969. Each participant was interviewed regarding present and future application of the data processing knowledge gained through the project. The results of this follow-up study are significant and comprise Appendix K of this report.

Course Completion

On September 29, 1969 (summer session) and January 6, 1970 (fall session), Certificates of Completion were presented to the participants who completed the course. Statistics regarding these 46 participants are attached. (See Appendix J).

Information Dissemination

A continuous dialogue was maintained with the Luzerne County Superintendents. At the second meeting the progress of the project was outlined and pertinent statistics regarding the participants were discussed. A question and answer period followed the formal reporting. Most of the questions asked were about the specific areas of learning which would be covered in the course. The superintendents were concerned with constructively utilizing the new knowledge of the participants when the course was completed. The third and final meeting was held in October, 1969, to discuss the progress of the project and in particular, the participants who finished in September.

In January, 1970, letters were sent to the individual superintendents listing the educators in their district who completed the course. The entire list was sent to Mr. Robert J. Rowland, Superintendent, Luzerne County Schools. (Note: Two superintendents completed the course.)

On June 26, 1969, Dr. Arch Steiner, United States Office of Education, Project Officer; Patricia Brislin; Dr. Ellis Roberts; and several members of the EDITS staff met with Dr. Donald Carrol, Assistant Commissioner of Education and other officials of the Department of Education of Pennsylvania in Harrisburg to discuss the progress and educational significance of EDITS.

The meeting commenced with a brief description of the project objectives. Discussion centered on curriculum content and course progress to date. The education officials were favorably impressed by the interest expressed in the program by local educators.

Newspaper articles concerning Project EDITS are included as Appendix N of this report.

Curriculum Evaluation

A curriculum evaluation by study areas was made as part of the total evaluation of Project EDITS (See Appendix H). It consists of:

1. Objectives

2. Degree of attainment

3. Methodology

4. Problem areas

5. Conclusions

6. Recommendations

This effort was assumed not only as a method of reviewing the project, but also for the distinct purpose of aiding interested participants and those who will use the EDITS curriculum

Some of the questions considered were:

... Was the material presented in the most logical order or sequence?

... Did the order of presentation help the students to understand each new subject by means of a foundation laid by the previously covered subjects?

... Was any material not sufficiently discussed to build a firm basis for the understanding of future sections of the course?

... Was any material given in too much detail?

... Was detail given which was either unnecessary to the understanding of the subject or confusing for the students?

... Would a speaker or field trip have added to the effectiveness of the unit?

... Would additional audio-visual aids have been helpful?

... Was the laboratory work sufficient?

... Were the students expected to do a level of work which was challenging but not unreasonable?

III. FINDINGS AND ANALYSIS

RESULTS

Ease of Recruiting Participants

Upon the announcement of the implementation of project EDITS, the enthusiastic response received, both from educators and administrators alike, was overwhelming. This interest was solidified with the receipt of 83 applications, thus providing a potential course enrollment of 138.33%. Though 13 applicants voluntarily withdrew from the course, it yet remained oversubscribed by 10 applicants. By means of a pre-established selection process (school population), these ten additional applicants were withdrawn bringing course enrollment down to 60 which conformed to proposal requirements.

Of the 13 original applicants who withdrew of their own accord, 5 withdrew due to the long course hours. However the remaining eight expressly stated they wished to be contacted should the course be given again.

Attendance

Absenteeism throughout the course was minimal, despite the long class hours and the total course length. In most cases, the participants attended another class if it was possible to make up the missed session.

Statistically the attendence level, based on the number of classes given and the total number of people participating in the course, was as follows:

	No. of Classes	Dates	Attendance Level
Group 1	74	2/3-9/29	95/7%
Group 2	76	2/3-12/30	92.1%
Average			93.9%

Despite the long course hours and total class length, enthusiasm remained high throughout as evidenced by the high attendance level maintained. It should be noted that the drop in the attendance level of Group II was solely due to combining of classes occurring in October. During all previous sessions absent participants were able to make up the class missed by attending on an alternate evening. With the combination of both groups, this was no longer possible, resulting in the lower attendance level.

Withdrawals

Any EDITS participant who withdrew during the course of the year was immediately contacted by either the Guidance Specialist or the Instructors in order to determine the reason for withdrawal. Twenty of the original participants had withdrawn from the course prior to its completion. Seventeen of these withdrew because of personal necessity; only three withdrew for reasons directly related to the EDITS course.

It is significant to note that of the 60 original participants, just one expressed dissatisfaction with the course.

Reasons for withdrawal are listed below.

	Participants	Rate of Withdrawal
Dissatisfaction	1	
Disinterest	1	
Non-Comprehension	1	Related to course
Total	3	5.00%
Illness	3	
Personal Problems	2	
Other Commitments (schedules, job, interferred with administrative duties, etc.)	9	
Graduate school	3	Unrelated to course
Total	17	28.33%

Dedication to Education

It may be interesting to note that while the field of data processing ordinarily presents a more financially attractive face, not one of the 60 participants has left the field of education for that of data processing. Rather, these educators are using their new found knowledge by dynamically applying it within their own classrooms and by establishing data processing courses within their schools.

These findings lead to the following conclusions:

(1) The original purpose of the course has been factually established.

(2) The interest of participants in the course was mainly due to an honest desire to become better educators.

Requests for Additional Data Processing Courses

The eagerness of the educator-participants to expand their knowledge and provide their students with an awareness of the technological advances they face has been proven by the enthusiastic response to the EDITS program. This satisfying response has been emphasized by the many requests from the EDITS participants for additional courses in the field of data processing.

Considering the 266 hours of time involved and the grueling effort required of the class members, their requests take on a more emphatic note.

Interest from Other Areas

Considerable interest local, national, and even international, was shown by both educators and those involved with the application of computers in the schools.

Community interest and favorable response to the project was evidenced by the offer of accreditation to participants who successfully completed the EDITS course initiated by the Chairman of the Department of Data Processing of King's College.

Favorable evaluation of the course resulted in the subsequent approval of an offering of 11 credits by the Academic Council of the College. This approval was indicative of the high standards inherent in the project.

Further evidence of the interest aroused by EDITS was the significant number of requests received for copies of the Data Processing Curriculum for Educators, which was used as the syllabus for the course. InTech also received many requests from educators for information regarding the project. These educators often expressed interest in participating in this type of a computer technology course and wished to know if it would be repeated.

On the state level, continual interest has been shown by the Pennsylvania Department of Education. The meeting between EDITS staff and Donald Carrol, Assistant Commissioner of Education, as well as other DPI officials, held on June 26, 1969 in Harrisburg, was in response to their desire to learn the objectives and operation of project EDITS. As a result of the Department of Education's continuing interest, Dr. Paul M. Wighaman and Dr. Ronald Hall, representatives of the Department's Bureau of General and Academic Education, visited both the summer and fall classes on September 17, 1969. The Bureau is considering the possibility of including computer technology as a subject area within the elementary-secondary curriculum. It was felt that the EDITS participants, with their newly acquired technical knowledge and their educational background, are in a unique position to evaluate the need for a computer curriculum in the Commonwealth's public schools.

Project EDITS received international attention in May of 1969 when it was discussed in an address given by Dr. R. Louis Bright, inter-disciplinary Professor at Baylor University, Texas, at a meeting of the Organization of Economic Cooperation and Development in Paris. Through this address, Dr. Andre Kirchberger, Administrator of OECD's Center of Educational Research and Innovation, developed an increasing interest in EDITS. As a result, Dr. Kirchberger visited Wilkes-Barre on July 15 to review the project. He was particularly impressed with the fact that the educators involved were being taught to apply data processing to their individual disciplines. Dr. Kirchberger was visiting the United States in connection with research being done by the center to develop an international uniformity of computer education and computer science curriculum in education.

Curriculum Effectiveness

To determine curriculum effectiveness, a total evaluation by each study area was made during the course of the EDITS program. (Refer to Curriculum Evaluation page 36).

Study areas presented in the curriculum are divided into three major phases as shown below. Detailed findings accumulated are presented in Appendix H.

Phase One - General Background and Programming

Evolution of Data Processing
Data Representation and Management
Concepts of Data Processing Hardware
Concepts of Data Processing Software
Computer Processing Techniques
Decision Making Techniques
COBOL Programming

Phase Two - Techniques and Applications

Data Processing Systems and Procedures Concepts
Integration of Systems and Programming
Practical Applications in Industry
Practical Applications in School Administration
Advanced Class Problem
Information Retrieval

Phase Three - Advanced Applications to Individual Disciplines

Concepts of CAI-CMI
Selection of a Computer
Data Processing Teaching Aids
Current Applications in Education
Individual Problem

As a result of this evaluation, these general conclusions regarding curriculum effectiveness can be made.

(1) It can be implicitly stated that the logical flow of the material presented in the curriculum was entirely justified and that no revision in topic order need be employed.

(2) This logical flow within the curriculum resulted in a total program which, considering the variables present, (those of levels of ability and interest) produced a totally effective program. Any one study area in which maximum effectiveness was not attained was due not to the study topic but rather to the methodology used in presenting the topic. Refer to Appendix H for specifics.

(3) Perhaps one consideration that could be mentioned with justification is the addition of a more diversified representation of the various computer languages available. For example, ForTran IV and/or PL/1 as well as COBOL. This option would perhaps more adequately serve those participants within the areas of math and/or science. Should this type of language be employed, either on a required or optional basis, inclusion should also be made of applications in the math-science areas. This addition would present a total, well-rounded curriculum with maximum effectiveness provided for all disciplines.

Revised Curriculum Hours

Field testing has provided the actual class hours utilized in presenting each curriculum topic. This schedule allows the completion of the course within the normal school year, allowing for holidays. This data is presented in Appendix I.

The same number of hours were utilized by all the classes in the spring session. A comparison between Groups I and II of class hours used, appears in Appendix I with deviation, beginning with Practical Application in Phase II. After data on actual class hours was obtained with Group I (summer), an appropriate adjustment in curriculum hours was made for Group II (fall). Reviews were necessary for the second group.

Explanation of class hour deviation per study area is as follows:

1. A review of Systems and Procedures Concepts was deemed necessary for those participants returning after the two month recess and was given during the first class.

2. During the Advanced Class Problem it was found that the summer vacation affected the recall ability of the participants in the areas of programming and systems design. As a result, 10 additional hours were required in this subject area.

3. It was apparent during the summer session that maximum presentation on Information Retrieval could be achieved within seven hours.

4. Utilization of one hour was deemed sufficient for presenting Data Processing Teaching Aids. A 3.5 hour presentation for this study area is justified only if computer games can be demonstrated.

5. Although the originally proposed time of 7.0 hours utilized on Current Applications in Education was used in the summer session, a more appropriate time of 2.5 (to 3.5) hours was found to be sufficient as a lead into the Individual Problem.

Need for Teaching Aids

A major deficiency has been noted in the lack of available teaching material in the data processing field. The rarity of pertinent visual aids is probably due to the rapid rate of obsolescence inherent in the computer industry. Technological advances are such that they tend to outdate educational materials soon after their becoming available. Even when materials were found to be available, major problems were encountered in regard to feasibility, instructional level, lead time in ordering, etc.

For example, throughout the program, much difficulty was encountered in locating a relevant text. Numerous texts had been examined for their appropriateness in relation to the total course. None were available; therefore, it was decided to use Programmed Instruction texts, for the evolution phase, published by IBM.

Difficulty was encountered also in the selection of appropriate COBOL texts for the participants. This difficulty arose, since COBOL has gone through two evolutions (COBOL-61, COBOL-65), and not all manufacturers have made COBOL-65 readily available. Also, computers vary in their ability to handle COBOL coding options.

When the computer to be used by the participants was selected, it was decided to use the texts published by the vendor. Modification of these texts was necessary in order to conform to UNIVAC 9300 COBOL. These modifications were then developed and distributed as supplemental material.

Problems also arose in the selection of a text in the *Data Processing Systems* and *Procedures Concepts and Integration of Systems and Programming* areas of Phase II. Many books were reviewed and subsequently rejected for the following reasons:

(1) Information within the text was outdated and third generation concepts were not included.

(2) One or two chapters of a given text were pertinent; however, the remaining chapters of the text were not usable in the program.

(3) Several of the texts covered general system procedures but neglected electronic data processing procedures.

As an alternative to using one text, the research team developed text material by adapting appropriate information. Key concepts were developed cooperatively by the staff and distributed to the participants.

Similar problems were encountered in obtaining relevant films. Throughout the program many were evaluated but few were deemed appropriate. Several reasons for rejection arose. Many were found to be too general. Available manufacturers' films were usually sales oriented, while military films were quite often geared to a specialized audience. Also many were either outdated, too technical, or geared to a lower age level. In addition, it often takes six weeks to six months of "wait listing" in order to receive a film for review. Therefore it was difficult and sometimes impossible to arrange for films to be shown at the point where they had the greatest relevancy.

In an effort to alleviate this major deficiency and to provide appropriate teaching materials for EDITS participants, InTech Corporation developed numerous slides, transparencies and supplemental materials. (See Appendix C.)

Effectiveness of Tutorial Assistance

The use of a Tutorial-Guidance Team proved to be an extremely effective method for establishing communication and instruction.

The Tutorial-Guidance team, consisting of a guidance specialist and systems analysts, was established for the purpose of meeting with all participants and providing guidance and assistance upon demand. (Refer to Section II - Major Activities and Accomplishments, Tutorial-Guidance, page 14). Meetings between participants and the tutorial team served to establish an interacting system. That is, these meetings allowed the team personnel to provide any necessary technical assistance, and equally important, to extract information regarding the participants reactions to the program. In turn, this direct information served as the basis for required adjustments in the course curriculum and the instructional presentation. Thus a more effective overall approach was achieved. As a result of this individualized attention each participant was able to discuss his problems and evaluate his progress.

It should be noted that while it was initially believed that maximum course effectiveness would be achieved by having the tutorial team visit the participant on his school site, findings indicate otherwise. Progressing to Phase II of the curriculum where extensive technical assistance was desirable, it was found that the limited free time of any educator-participant on his school site, oftentimes cut short the technical assistance being provided by the tutorial team. Therefore, it was concluded that the ideal situation could be achieved by participants visiting the InTech office on an "as required" basis. Assistance was provided at any time to an individual or to a group. Much more effective assistance and personalized attention was brought about by this method which served to generate new interest from the participants.

The employment of an instructional team in-class proved to be a useful procedure. More individualized instruction was effectuated; a necessary requirement when presenting technical material in a concentrated course.

Overall, it was found that contact with the tutorial personnel throughout the entire course allowed participants to be more readily comfortable with the instructional team in the classroom. Thus the effectiveness of the total program was increased.

Laboratory Application

Some measure of the effectiveness of the project was obtained through an evaluation of two major laboratory projects completed by the participants.

The first was associated with the study unit on *Selection of a Computer*. Lecture, associated with the unit, provided participants with the facts to be considered and guidelines to be followed in the process of selection. Following the lecture, proposals from three pseudo computer manufacturers were distributed. Also stated were the present and future needs of the school, for which the computer was being purchased. (See Appendix D.)

Participants were required to finalize a choice of vendor by providing justification for their choice. Documentation required was:

(1) Description of the proposed system

(2) Choice of Vendor

(3) Justification of the Choice

(4) A Decision Table

(5) Reasons for Rejection

A copy of the narrative documentation is included in this report to allow the reader an appreciation of the effort put forth by each participant. (See Appendix E.) An example of the decision table which was also completed by the individual can be seen in Appendix D.

Members of the EDITS staff evaluated each project. This evaluation revealed that the majority of participants attained a significantly high degree of understanding and applicability of the concepts in selecting a computer.

The second major laboratory project evaluated was that associated with the Individual Problems. Each participant was required to select a problem related to his discipline which could be alleviated by means of data processing. It was required that they submit a proposal to the instructor, detailing the problem statement, the purpose of the study, the methodology planned and the objectives expected. Guidelines to the selection, design, implementation and finalization of the Individual Problem were distributed to all participants. (See Appendix F.)

As the proposals were submitted, they were examined by a team of staff members in order to determine the feasibility of each selection. The following factors were taken into consideration while evaluating the proposals: complexity of the project, participants capability, and equipment limitations. Most of the projects were approved as originally proposed. However, based on mutual agreement, a few were either refined or a new project was selected. Variety, uniqueness and applicability to all disciplines was evident throughout.

Thirty-five class hours were devoted to the Individual Problems. Participants were encouraged to attend all classes during this time. The highest calibre of guidance and assistance was attempted, and its success was perhaps most clearly evidenced by the fact that the majority of participants attended sessions regularly. During the classes, the guidance provided was primarily related to the work accomplished between class sessions.

It was of much interest to note the fact that not only did the participants regularly attend the class sessions, but they also frequently visited InTech offices for additional guidance. This alone was indicative of the tremendous interest and enthusiasm evident throughout the course but perhaps magnified during this phase.

The in-class tutorial assistance team consisted of the instructor and two systems analysts. Ten participants were assigned to each member of this team, allowing him to become completely familiar with the details of each project. Thus, more effective guidance and assistance was provided.

Although a total of 35 hours of class time was devoted to the Individual Problems, the completed projects revealed that the majority of participants devoted many hours beyond those required. The tremendous amount of effort which was utilized in producing the finalized products resulted in many which were rated as being excellent.

Copies of completed projects are on file at the Wilkes-Barre, Pa. office of InTech.

Participants' Application of Data Processing Knowledge

As a result of a follow-up study made on the members of the summer session, and through the evaluation of the completed Individual Problems, the inter-disciplinary application of data processing, produced by the project, has been factually established.

Applicability in Individual Problems

Listed below are the areas and disciplines in which EDITS participants utilized their newly acquired knowledge. Individual Problems associated with each area are also enumerated.

Business Education

1. Processing Sales Orders Systems
2. The Preparation of Student Profiles and a Limited CMI Program for Office Practice
3. A System for Computerizing Accounts Receivable
4. The Introduction of a Computer Application to an Accounting I Class Through the Comparison of a Manual Payroll System and an Automated Payroll System
5. A Follow-Up Study for Grades of a Business Education System
6. Computerizing an Accounts Payable System
7. Computerizing a Payroll Reporting System
8. Bookkeeping Practice Sets System

Chemistry

1. The Utilization of Computer-Assisted Instruction in the Chemistry Curriculum

Elementary Education

1. A CAI Program for Teaching the Long Vowel A to Elementary Students
2. A CAI Program to Identify Fractional Parts

French

1. The Correction of French Vocabulary Tests

Guidance

1. An Automated System for Guidance, Health and Permanent Records
2. Determination of School Courses Most Beneficial to Students Either in Securing Jobs or Furthering Their Education

Health Education

1. A System for Controlling Hospital Narcotics

History

1. A System for Studying Urban History

Industrial Arts

1. Computer Assisted Numerical Control Programming
2. Industrial Arts Education - A CAI Course in Tool Recognition
3. Gage Control by Computer
4. The Computer as a Tool in the Industrial Arts Metal Shop

Mathematics

1. A CAI Course in Quadratic Equations
2. The Trigonometric Function - A Computer-Assisted Program

3. Development of a CAI Program for Teaching the Use of Venn Diagrams in Solving Problems in Set Theory

4. Solution of Simultaneous Equations in the 2nd and 3rd Degree to Reinforce Classroom Teaching

Music

1. The Use of CAI to Introduce the Basic Concepts of Music Theory

Physical Education

1. A Computer Program to Process Football Scouting Data

Psychology

1. A System for Studying Amounts of Sleep with Regard to Learning, Judgment, Recall and Retention.

Reading

1. An Analysis for Remedial Reading Results

2. A System for Maintaining and Updating Reading Records

School Administration

1. Automating a School District Payroll

2. A Study to Expand the Present System of Grade Reporting to Produce a CUM in the Major Discipline.

3. A Data Processing System for a Professional Personnel Profile of the Wilkes-Barre City School District.

4. A Method of Analyzing and Reporting the Effect of the Textbooks and Instructional Materials for the Elementary Schools
5. A Method of Attendance Record Keeping for Hazleton Senior High School
6. Solving the Payroll Problem in a College
7. An Automated Payroll System for a School District
8. A Grade Reporting System
9. COBOL Program to Evaluate Tests and Assign Grades to Students (COPETAGS)
10. Computerized Attendance Accounting System for Dallas Senior High School
11. Inventory of Books and Supplies
12. Grade Reporting
13. A Book Inventory System
14. A System to Handle Purchases, Disbursements and Budget Analysis

School Library Automation

1. An Automated System to be Used in the Wilkes-Barre City School District's Elementary and Secondary Libraries.

Spanish

1. Graded Work Study of Current Spanish Textbooks

The list provided above clearly indicates that the main objective of the EDITS program has been more than adequately met. It did succeed in teaching educators to apply computer technology to their own disciplines, and also to consider the computer a tool to be used to enhance their profession. In each of the above sixteen areas, participants applied their newly acquired knowledge in a unique and creative manner. (Refer to Appendix G for proposals submitted by EDITS participants in preparation for Individual Problems.)

Summer Session

Post-EDITS Applicability. The follow-up study made on those EDITS participants who completed the course on September 29, 1969 revealed the following significant findings:

Thirteen of the 14 EDITS participants are presently applying their acquired data processing knowledge within their own classrooms or schools. Further, all of them are planning for future application.

Also significant is the fact that two of these participants are now teaching a data processing course on the high school level. Prior to the EDITS program, no program of this type existed in these schools. Due to pre-established curriculum schedules, each course is now given on a limited basis; however, plans have been made by both the educators and their associated schools to include a full-time program of data processing in the school curriculum in September, 1970. Considering the short period of time which has elapsed, it is quite clear that these two EDITS educators have made tremendous strides in implementing and extending their newly acquired knowledge.

Further representation of the effectiveness of the EDITS program is illustrated by the employment of one member in a part-time position as instructor of a data processing course. As such, he reaches some 35 educators in the Columbia, Carbon and Luzerne counties of Pennsylvania, in a Computer Science Program.

Summer participants were as follows. Disciplines and schools are included in Appendix K.

1. Christian, Helen
2. Daru, George
3. Drobnicki, Mary Ann
4. Elias, Michael
5. Fidrych, Stanley
6. Hontz, Arthur
7. Lipiec, Eva
8. Petrenchak, Joseph
9. Powell, Robert
10. Rother, Dorothy
11. Sable, Miriam Ann
12. Shemanski, Henry
13. Wazenski, Joseph
14. Yuhas, Joseph
15. Wells, Jeanne

Student Evaluation of Course

Following the completion of the EDITS course a letter was sent to all of the participants requesting their personal evaluation of and reaction to the EDITS program. They were also asked to submit criticisms or recommendations which may prove to be helpful in the future. The majority of the letters expressed appreciation for the opportunity to participate in the program. Their reactions to most aspects of the course were favorable.

In general, the participants were impressed with the high calibre of the instruction which they received. They thought that the material presented was both comprehensive and well organized. The course itself was thought to be conducted in a professional manner. Praise was given the instructors for being knowledgeable and well-prepared. A few participants made a point of expressing their approval of the team teaching method which was used during the course's laboratory sessions. Others especially appreciated the assistance outside of class which was available.

The participants expressed their belief that they had gained an understanding of both the technology and the capabilities of computers. They also felt they now had a working knowledge of the subject which could be passed on to their students. In addition, several of them thought that the EDITS course had directly resulted in making them better teachers, by enabling them to draw upon their new knowledge of electronic data processing within their classes.

Although most of the participants felt that the EDITS course was entirely successful, there were a few criticisms and recommendations. One participant thought that there was too much material included in the course and several participants wished that the classes had not been so lengthy. One participant recommended that more laboratory work be included in the course. Other recommendations made were that more exposure to computer hardware be given, and the course include compulsory outside assignments. (See Appendix L)

IV. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Attainment of Objectives

Project EDITS has succeeded in enabling teachers to gain the qualifications necessary to provide a better foundation for meeting the critical needs of the nation in electronic data processing. Through continuing evaluation during the entire project, as well as extensive final review, InTech believes that each of the objectives stated in the proposal for project EDITS has been met. These objectives were:

1. Instruct teachers in a comprehensive data processing program with the most recent equipment (third generation hardware and software), thereby developing trained educators capable of teaching data processing courses.
2. Broaden the knowledge of educators by making them aware of the impact of computers on their own lives and of existing utilization within their own disciplines.
3. Allow teachers to develop their own techniques that will implement computer information technology as an effective classroom tool and a potent administrative device, within their school districts.

Comprehensive Education

Project EDITS provided an in-depth, totally comprehensive computer technology course for 60 educators. Consisting of 259-266 hours of class time, it included lectures, "hands-on" computer experience, laboratory work, field trips and guest speakers. It encompassed far more than the usual data processing course which often teaches little more than programming. Included were extensive units on topics such as the history and development of data processing, current hardware in use, the most recent software developments, programming, the systems approach to data processing problems and the current and prospective applications of computer technology in business, school administration, social studies and science.

A major requirement in the programming phase was that the latest developments in hardware be utilized. During systems design the use of recent equipment, particularly random access files, was emphasized. Alternate file designs for tape and disk were discussed. The participants were individually responsible for analyzing each case study to determine the most efficient method for implementation.

Teaching Electronic Data Processing

The fact that the EDITS course was successful in developing trained educators, themselves capable of teaching data processing courses, was proved by the follow-up study made of the summer class which was completed in September, 1969. Six of the 15 are subsequently teaching data processing courses.

Three of these educators had not taught data processing nor had any exposure to the subject prior to the EDITS course. Nevertheless, they were quite capable of accurately passing on their recently gained knowledge. Two are now teaching data processing courses on the high school level; the third, on a part-time basis, is instructing other educators.

The other three participants who previously taught data processing found that they have been able to make many improvements to their courses since the completion of the EDITS class. They strongly feel that the information gained through the EDITS course gave them a wealth of new knowledge to draw upon and thus provided a favorable effect upon their teaching of data processing. In addition, two of these instructors were able to expand the scope of their courses after the completion of the EDITS class. Whereas their previous data processing courses included little more than programming instruction, they now offer significant information on systems analysis and design. These additions now mean that their courses more adequately cover the field of data processing, rather than just one element of it.

Impact of the Computer

The EDITS course also succeeded in impressing the participants with the vast impact of computers on their own lives, on education, and on modern society as a whole. The very first unit of the course included a discussion dealing with the impact of the computer upon the individual and the governmental and industrial segments of society. More importantly, the EDITS participants gained a significant knowledge of current methods for utilizing computers in their own professional area whether it was school administration, guidance, or teaching subjects such as music, literature, social studies, or science. In addition, one unit of the course dealt extensively with Computer Assisted Instruction (CAI) and Computer Managed Instruction (CMI), and its usefulness in providing individualized instruction in many disciplines at both the elementary and secondary level. Not only was lecture material given on existing utilization of computers in education, but in addition, each participant undertook a research project which required him to investigate the latest applications for computers in his area of interest.

Computer Technology in Education

Once the EDITS participants had learned of the various uses of data processing within the field of education, each was given an opportunity to individually develop a computer application within his own or related discipline. After evaluation of the projects, the EDITS staff feels that all of the individual problems show a surprising degree of competence on the part of educators, to whom the field of electronic data processing was quite foreign just a short time ago. Many of the applications chosen were those which the participant had hopes of implementing in his school or school district in the future. The actual experience of designing, and in some cases programming, an application of their choice gave the participants a chance to develop techniques which they were able to take out of the EDITS class into their school districts for future use.

The success of the project in developing educators capable, not only of teaching data processing, but also of using computer technology as a tool in the classroom or in administrative work is evident in the experience of the summer class since they completed the EDITS course. These educators have used their knowledge in such diverse classes as

Spanish, Music Theory, Office Practices, Drafting, and Industrial Arts. In some cases they were able to use new techniques, such as flowcharting and computer assisted instruction methods, to improve their teaching of traditional class material. In other cases, the educator has been able to include in his class pertinent material which was previously omitted. For example, a discussion on electronic music composition, practice sets on automation in office practices courses, and numerical-control machinery in industrial arts classes.

Applications of computer technology learned by the EDITS participants are being considered for use outside of the classroom as well as within. Several participants have been asked to aid their school district in the selection of a computer. In addition, at least one participant is planning to design administrative applications such as student scheduling, payroll, and budget systems.

InTech feels that the EDITS participants who are now using their knowledge of electronic data processing to introduce students and other educators to this field, or to improve their effectiveness as teachers or administrators provide the best indication of the success of the EDITS project. By means of this type of project, professional educators from all disciplines are now able to utilize the power of this dynamic tool, the Computer.

RECOMMENDATIONS

Continuing Education in Computer Technology

Based on the experience gained from project EDITS, InTech Corporation makes the following recommendations in regard to the dissemination of electronic data processing information.

First, that the training of educators in the field of computer technology be continued and expanded. Project EDITS has provided proof that the training of educators is an effective means of familiarizing today's students with current data processing techniques, thereby beginning to fill the "people gap" existing in the industry. The EDITS course demonstrated that educators not only in the areas of school administration and guidance, but in all disciplines are capable of understanding computer technology. The follow-up study undertaken as part of the project showed conclusively that the participants in the course were able to apply their knowledge of data processing as a classroom and administrative tool. Further findings indicate that these same educators are disseminating the information which they obtained by formally teaching special data processing courses or applying it informally in their classrooms.

In addition to an increased emphasis on the training of educators in data processing, InTech corporation recommends that the direct training of other segments of the population should not be neglected. A comprehensive course such as that included in project EDITS could be revised without major effort for use with other groups. For instance, a similar course could be provided for high schools, colleges, and adult education. Each of these courses would be substantially the same, although the level of teaching or tenor in each course would vary, as would certain content units.

Development of Specialized Data Processing Courses

Another recommendation is based on the realization that all educators interested in becoming knowledgeable in the field of data processing are not able to participate in a course as time-consuming as EDITS. It would be especially difficult for those with supplementary jobs or for those working toward higher degrees. Therefore, it would appear to be worthwhile to develop several shorter courses capable of meeting the specialized needs of various groups of educators. Such courses, although not as comprehensive, could satisfy the needs of many educators. At least three could be developed; one designed solely for school administrators, another for school guidance personnel, and a third course for those teachers who are to be involved with computerized instruction. All of these courses require the inclusion of an introduction to electronic data processing. Beyond this however, they would be tailored for their particular audience.

Development of Data Processing Teaching Materials

Finally, InTech feels that there is great need for the development of teaching materials in the data processing field. The experience gained from the EDITS project made the scarcity of good films and other visual aids apparent. An even greater handicap in presenting the EDITS program resulted from the lack of relevant texts for the course participants. Too often texts included outdated concepts or neglected such major topics as data processing systems and design or new computer applications. Despite the fact that rapid technological advances tend to quickly outdate educational materials in the data processing field, it seems that this problem could be overcome or minimized. The design of material in a modular manner and the development and operation of systematic review and updating procedures would contibute greatly in solving this problem. Certainly the need for current relevant data processing teaching material is so vital that improvement must be made if the education effort in computer technology is to be meaningful.

APPENDIX A

BIBLIOGRAPHY - REFERENCES FOR EDITS CURRICULUM

Listed below by study area are the sources which were used in researching the various topics covered by the EDITS course. These sources were used in addition to the Data Processing Curriculum for Educators, contract reference number 8-0449, which formed the foundation for the course.

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APPENDIX B

EDP Information and Reference Sources

This appendix contains a compilation of various EDP information and reference sources. Specifically listed sources are:

- Reference Information
- Films
- Filmstrips
- Slides
- Data Processing Terminology Booklets and Sources
- Source Addresses for Audio-Visual Aids
- Educational Technical and Management Societies
- Technical Journals and Magazines
- Educational Journals
- Directory of Manufacturers

REFERENCE INFORMATION

Annual Review of Information Science and Technology: Interscience Publishers, Inc., 605 3rd Avenue, New York, New York 10016

A consolidation of the latest developments in information science and technology prepared by the American Society for Information Science.

Applied Science and Technology Index: H. W. Wilson Co., 950 University Avenue, Bronx, New York 10452

A subject index of periodicals in science and technology including automation.

American Society for Information Sciences: 2000 P Street, N.W. Washington, D.C.

Answers inquiries, provides references and makes referals concerning all aspects of data processing.

Association of Educational Data Systems: 1201 16th Street, N.W., Washington, D.C. 20036

Provides information by answering specific technical questions, referrals, and by consulting and advisory services.

Automation Research: SABE Press San Diego State College, San Diego, California 92115

Listing of thesis, dissertations and independent studies.

Bibliography Index: H. W. Wilson Co., 950 University Avenue, Bronx, New York 10452

A library service charged in accordance with the amount of service the use of the index affords the subscriber.

Burroughs Clearinghouse: Burroughs Corp. 6071 2nd Avenue, Detroit, 32, Michigan

Technical publications relating to all phases of the data processing industry.

Business Periodicals Index: H. W. Wilson Co., 950 University Avenue, Bronx, New York 10452

A cumulative index to periodicals in the fields of business including automation.

CAI - A Survey of the Literature: Entelek Incorporated, 42 Pleasant Street, Newburyport, Mass. 01950

A survey of CAI with data culled from research reports, articles, books, and other documents.

Clearinghouse for Federal and Scientific Information: U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151

U. S. Government's center for the collection and sale to the public of technical reports resulting from Government-financed research and development.

Computer-Assisted Instruction Guide: Entelek Incorporated, 42 Pleasant Street, Newburyport, Mass. 01950

Detailed specifications on CAI programs developed at over 100 CAI centers, ranging from pre-school to adult industrial and military training.

Computer Characteristics Quarterly: Adams Associates, 128 The Great Road, Bedford, Mass. 01730

Lists the salient features of essentially all digital computers and peripheral devices commerically available. Reissued in entirety four times a year.

Computer Directory and Buyers Guide: published each year in the technical magazine Computers and Automation.

A complete series of rosters covering all aspects of the electronical data processing industry.

Computer Notebook: Auerbach Information, Inc., 121 North Broad Street, Philadelphia, Pa. 19107

Keeps subscriber aware of new developments in the computer field, conducts primary investigations of system features and limitations, compares operating performances of present systems with others, evaluates input/output equipment characteristics, reviews features, limitations, software and prices of new systems, supplemented monthly.

Computing Reviews: Association for Computing Machinery, 211 East 43rd Street, New York, New York 10017

A monthly publication with information on all current publications in computer science, including mathematics, engineering, natural and social sciences, and the humanities.

Datrix Service: University Microfilms, Inc., Ann Arbor, Michigan 48106

A source of dissertation titles in response to inquiries. Catalogs of key works are available on request.

Data Communications Reports: Auerbach Information, Inc., 121 North Broad Street, Philadelphia, Pa., 19107

An analytical reference service on communication systems design, common-carrier facilities, comparison charts, communications terminal equipment and communications processing equipment supplemented quarterly.

Data Handling Reports: Auerbach Information, Inc., 121 North Broad Street, Philadelphia, Pa. 19107

Contains detailed information on sources data recording equipment, input preparation equipment, data transcription equipment, unit record equipment, forms handling equipment and supplies, supplemented quarterly.

Data Processing Systems Encyclopedia: American Data Processing, Inc. 19802 Mack Avenue, Detroit, Michigan 48236

A useful general reference on computers and related devices, updated periodically.

Data Processing Yearbook: American Data Processing, Inc., Book Tower, Detroit, Michigan 48226

List computer users' group, associations with an interest in data processing, data processing products and services, and manufacturers of various products.

Defense Documentation Center: Cameron Station Building 5, 5010 Duke Street, Alexandria, Va. 22314

DDC provides a central service for the dissemination of Department of Defense (DOD) scientific and technical reports.

Educational Products Information Exchange Institute (EPIE): 527 Lexington Avenue, New York, N.Y. 10017

An independent organization which supplies information about the availability and effectiveness of educational materials, equipment and systems.

Educational Resources Information Center (ERIC): Research in Education, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

Provides document and project indexes and resumes.

ICP Quarterly, 5704 N. Gilford Avenue, Indianapolis, Ind. 46220.

A publication listing computer programs available to buyers, with descriptions, sources, and price.

Information Research Center: Battelle Memorial Institute, 505 King Avenue, Columbus, Ohio 43201

Provides information on the state of the art of information systems and other aspects of the communication of scientific and technical information and data.

Knowledge Availability Systems Center: University of Pittsburgh, Pittsburgh, Pa.

In cooperation with NASA, this center tries to maintain the most recent scientific data on information systems materials.

Library of Congress Automation Techniques (LOCATE): Information Systems Office, Library of Congress, 2nd and Independence Avenue, S.E., Washington, D.C. 20540

Collects and disseminates information concerning existing and proposed automation projects for use in libraries. Services include reference, referral, and services of materials in the exchange's file.

McGraw-Hill Encyclopedia of Science and Technology: McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York, New York 10036

Mechanized Bibliography of Documentation and Information Sciences: Department Library, U.S. Department of the Interior, Washington, D.C. 20540

Bibliography compiled by H. Holzbauer.

National Referral Center for Science and Technology: Library of Congress, Washington, D.C.

Requests for information should be on specific subjects (i.e. data processing, computers, etc.)

Scientific and Technical Information Division: National Aeronautics and Space Administration, Washington, D.C. 20546

Provides a central service for the dissemination of scientific and technical reports dealing with the national space program.

Software Notebook: Auerbach Information, Inc., 121 North Broad Street, Philadelphia, Pennsylvania 19107

Reference service containing computer system software reports, fact-filled summaries of system characteristics, designed to facilitate comparisons.

Standard EDP Reports: Auerbach Information Inc., 121 North Broad Street, Philadelphia, Pa. 19107

Ten volumes consisting of detailed reports in computer systems analyzing system performance, equipment and software, updated monthly. The ten volumes can be obtained in specialized subsets of an eight volume edition, containing information on systems that have general application to business and scientific problems, and a three volume edition which reports on scientific and control computers.

Technology Information Exchange: National Bureau of Standards, Center for Computer Sciences and Technology, Connecticut Avenue and Van Ness Street, N.W., Washington, D.C. 20234

A specialized information center which provides technical support to members of the computer community, also answers inquiries on government automation projects and makes referrals.

FILMS

The ABC's of Computers, 16 mm., 25 minutes, General Electric Company.

A brief description of the basic principles of computers.

The ADA Story, 16 mm., 28 minutes, color, R.C.A.

A Lockheed production illustrating data collection from a four factory complex linking 400 information points with a centralized computer system.

Area of Action, 16 mm., 29 min., Modern Talking Picture Service.

Data Processing applications in Australia, Taiwan, India, Japan and Burma. Shows how EDP is helping to develop some of the important industries of these Asian countries.

Automation, (From "See it Now" TV Series) 16 mm., 84 minutes, Pennsylvania State University.

Television reporter, Edward R. Murrow, presents some of the problems associated with the advance of automation, and covers its use in a wide variety of industries. Interviews with prominent personalities explore the social and economic impact of automation.

A Better Way! (With Data Processing), 16 mm., sound, color, 30 min. Modern Talking Picture Service.

About people who had a problem and found a better way to solve it. Some unique applications of data processing equipment are applied. For adults, college and senior high school groups.

A Better World, 16 mm., color, 8 min., Modern Talking Picture Service.

Describes the influence of computers in our daily lives. A fast montage of applications are shown including education, medicine, traffic control, space research, law enforcement, and business.

Census '60, 16 mm., sound, black and white, 13 min., Free Loan. UNIVAC.

An explanation of how and why United States Census data is collected, compiled, and evaluated by means of FOSDIC (Film Optical Sensing Device for input to computers) and the UNIVAC 1105 Scientific Computer.

COBOL, (Produced by Westinghouse) 35 mm., 20 minutes, color, Burroughs Corporation.

The Computer and the Mind of Man, 16 mm., sound, black and white, 30 min., rental $5.25. NET Film Service.

An excellent basic introduction to computers. The computer revolution is discussed by Dr. Richard C. Haming, of Bell Telephone Laboratories. Dr. Ernest Nagel of Columbia University talks about the relationship of man and machine and the relationship of the symbolic world of mathematics to the real world of objects and events. Suitable for college level.

The Computer Comes to Marketing, 16 mm., 30 min., Fortune Films.

A description of computer applications in marketing and the benefits of data processing.

A Computer Glossary, 16 mm., 10 min., color, Modern Talking Picture Services.

Uses highly imaginative animation, pictures and narrative, this film takes you on a "fantastic voyage" into the complex microcircuitry of a computer. The film also defines in basic terms the terminology of computers today such as flowchart, boolean logic, nanosecond and simulation to give the viewer an enlarged understanding of electronic data processing.

Computer Units, 16 mm., 24 minutes, color, Norwood Films.

An introduction to the basic components of a computer system and their functions.

Digital Computer Techniques, 16 mm., 18 min., color, U.S. Navy.

A general introduction to computers. Produced in 1962.

The Disks That Are a Cylinder, 16 mm., sound, color, 10½ min., Free Loan, IBM.

The IBM 1301 Disk Storage and the concept of read/write heads for each data disk surface is presented here.

Electronic Computers and Applied Mathematics, 16 mm., sound, color, 23 min., rental $5.50, Bureau of Audio-Visual Instruction, State University of Iowa.

Explains the basic principles and operations of electronic computers and the use of Binary Arithmetic so that number systems are more meaningful. Interest in mathematics and science careers is stimulated by the unusual uses of the computer presented here.

Electronic Computer Language Translation, 16 mm., 31 min., National Science Foundation.

A description of the computerized techniques of Russian translation to English.

Electronic Computers Improve Management Control, 16 mm., sound, color, 15 min., University of California.

Presents a predicament in a typical manufacturing organization which arises when a large customer order is cancelled because of production delays. Shows how the latest type of business machines can be used to design an efficient production control system.

The Electronic Shelf, 16 mm., 20 min., color, UNIVAC.

Information retrieval techniques using UNIVAC mass storage devices.

Electronics for Accounting and Business, 16 mm., 23 minutes, color, Arthur Anderson & Company.

Introduction to computers and applications in industry.

Flight Simulation, 16 mm., color, 20 min., Modern Talking Picture Service.

Informs the aerospace industry of a unique programming approach to the problem of real-time flight simulation. This approach makes use of digital equipment in place of the traditional analogue equipment generally used by the aerospace companies for simulation work.

Flow Process Chart and How to Use It, 16 mm., sound, color, 15 min., University of Michigan; University of California, Extension.

Demonstrates process analysis through flow chart; application to work-simplification. Step-by-step entries, coding by symbols, graphic development of information. Reviews complete procedure with a flow-process-chart analysis of a man shaving.

The Information Explosion, 16 mm., color, 21 min., National Science Teachers Association.

The purpose of this informative, but non-technical film is to restore balance to our appraisal of the computer's true role in contemporary society: to show that the computer is the tool of man rather than the reverse. That man does the thinking which directs the computer is constantly emphasized.

The Information Machine, 16 mm., or 35 mm., 10 minutes, color, IBM.

A colorful animated account of the development of the electronic computer and ending with simulation.

Innsbruck-Tokyo-64, 16 mm., 9 minutes, color, IBM.

Explanation of the collection, computation, and immediate world wide distribution of the results of the 1964 summer and winter olympic games.

Introduction to Automatic Data Processing, 16 mm., sound, black and white, 31 min., Free Loan, Fifth Army.

The underlying concepts, capabilities, operations and application of ADP as a management tool is discussed. Computer systems used in many federal government installations are shown. By means of animation, many features, operations and functional componenets of ADP are analyzed. Much attention is given to communication networks, I/O devices and the CPU. For demonstration purposes a simple problem is processed.

Introduction to Digital Computers, 16 mm., 25 minutes, color, UNIVAC.

An animated description of the basic functions of a computer.

The Living Machine, 16 mm., black and white, Part I - 29 min. Part II - 30 min., Sterling Educational Films, University of Southern California.

Demonstrates the "artificial intelligence" of computers. A New York checkers champion "challenges" an IBM computer to a game of checkers and gets a run for his money. Many other diverse applications shown.

Logic On a Chip, 16 mm., 9 minutes, color, RCA.

A presentation on integrated monolithic circuitry as third generation electronics for RCA computers.

Machines That Think, Free loan, USAEC.

Research at Argonne into the future scientific uses of electronic computers is shown in this presentation which stresses non-numerical manipulation of symbols. Computers are taught to make qualitative judgements, to interpret the significance of patterns such as spark chamber photographs, and to control laboratory experimental apparatus.

Man and Computer .... a Prospective, 16 mm., color, 20 min., Modern Talking Picture Service.

Discusses some of the basic elements in data processing such as input, output, storage, and control. These are explained in detail with examples. In addition, the binary system is illustrated and defined.

Management of a Time-Sharing System, 16 mm., sound, black and white, 14 min., System Development Corp.

Describes a general-purpose time-sharing system with emphasis on the novel techniques used to allocate space and time to the more than 300 authorized users of the system. Intended for a semi-technical audience which has some acquaintance with time-sharing.

Memory Devices, 16 mm., sound, black and white, 28 min., Free loan, Bell Telephone Company, Western Electric Co.

Shows information storage devices used in computing machine memories and explains how binary information is stored in them. Basic concepts and terms are explained and examples are given of mechanical, electro-mechanical, magnetic, electrostatic and photographic memories. Punched card, punched tapes, magnetic tape and drums, relays, ferrite cores and sheets are among the many memory devices are shown.

A Numerically Controlled Machine Tool, 16 mm., sound, black and white, 20 min., Free. M.I.T.

Presents the basic principles of numerical control of machine tools. The first numerically controlled machine tool, developed in 1952 at M.I.T. is described. The decoding of the commands punched on paper tape into control signals is shown. These control signals, when applied to servomechanisms, drive the axis of machine motion.

Shown in the film are the basic steps taken in the manual preparation of the input-control tape.

Operating System 360, 16 mm., 60 minutes, IBM; Modern Talking Picture Service.

A lecture of a highly technical nature describing the reasons for an operating system and how they are implemented.

Programming, 16 mm., sound, color, 15 min., U.S. Navy.

Defines computer programming. Explains what is meant by analyzing the problem, shows how a simple flowchart is prepared, and shows how instructions to the computer are encoded in computer language.

Programming In ForTran IV, 16 mm., sound, black and white, 30 min., Rental $10.00 one day, $5.00 each additional day, Office of Educational Television, University of California.

Complete aid to teaching ForTran IV.

The Question Tree, 16 mm., and 35 mm., sound, color, 13 min., Free Loan, IBM.

Presents an examination of man's age-old curiosity concerning his surrounding world - and the results of man's curiosity. Shows how intelligent questioning leads to scientific discovery. Sequences on cryogenics, vapor growth, language translation on optical masers are included. Film won international film awards. Suitable for both school audiences and adult groups.

Right on the Button, 16 mm., color, 10 min., Internal Revenue Service.

Explains the use of automatic data processing as used by the Internal Revenue Service. A return is followed from filing to the National Computer Center.

RPG for System/360, Audio Education, Department of Edcuation, IBM.

This is a programmed instruction course consisting of a class notebook and an audio tape recording. The course required approximately one 2½ hour session and covers 360 Report Program Generator for card, tape, and disk.

Sign On/Sign Off, 16 mm., 24 min., color, The Pennsylvania State University.

Presents the basic methods of computer-assisted instruction (CAI) in non-technical terms to introduce the importance and effectiveness of computers as a learning source. Standard classroom procedures are contrasted with sequences taken at the computer terminals. Students comment of their experiences with CAI.

Small Miracle, 16 mm., 14 min., color, IBM.

A description of the use of computers in man's search for knowledge with illustrations in space technology, bridge design, and others.

Space Age Administration, 16 mm., 20 min., color, RCA.

Personnel records of the Air Reserve maintained by computer to aid in maintaining readiness. Very General.

Systems, 16 mm., 14 min., Modern Talking Picture Service.

An explanation of how computers are used as a problem-solving tool in government, science and industry.

Then and Now, 16 mm., 12 min., color, UNIVAC.

The development of ENIAC, the first electronic computer and a discussion by the designers, J. Eckert and Dr. Mauchly. Presented on an introductory level.

Thinking Machines, 16 mm., sound, color, 20 min., Rental $2.00, University of California.

A "Horizons of Science" film. This film presents various approaches and experiments in machine intelligence, with Claude Shannon of M.I.T., Alex Bernstein of IBM and Leon Harmon of Bell Laboratories.

This Business of Numbers, 35 mm., color, 20 min., free loan, UNIVAC.

From the caveman to the modern scientist, arithmetic is traced with amusing cartoons from its beginning to modern data-processing systems.

Time Sharing on the Air, 16 mm., sound, black and white, 30 min., Systems Development Corp.

The SCD-built time sharing system is discussed and described. Involved in a technology which enables many users to have essentially simultaneous access to a very large computer by means of a remotely-located teletype unit.

To Bridge the Gap, 35 mm., color, 18 minutes, Burroughs Corporation.

Concepts and some uses of paper tape as a media for data recording.

Universe of Numbers, 16 mm., black and white, 30 min., Rental $5.25, National Educational Television.

Gives the history of computer development from the first mechanical calculator invented by Blaise Pascal to the first completely electronic calculator built in the 1940's. A description of the construction of this first computer is given.

What Do You Want, 16 mm., sound, color, 20 min., free loan, UNIVAC - Division of Sperry Rand.

Traces the development of elecronic computers from ENIAC to UNIVAC III. Emphasizes how UNIVAC, backed by the resources of Sperry Rand, pioneered and will continue to lead in the development and production of computing systems. J. P. Eckert, Co-inventor of the first digital systems, gives a glimpse at the computers of the future, exploring such areas as speed, storage and application.

The World of Real-Time, 16 mm., color, 15 min., UNIVAC - Division of Sperry Rand.

Shows various real-time systems including an inter-line world-wide communication system for major airlines, a country-wide shopping chain in Finland, and a major manufacturer in Georgia.

FILMSTRIPS

Available from:

UNIVAC - Division of Sperry Rand Corporation,
Remington Rand, Sperry Rand Building, New York,
New York 10019

The Business of Numbers

Available from:

IBM Corporation, 590 Madison Avenue, New York, New York
10022

Card Punching
Card Sorting
The Educated Computer
Mark Sensing
Scheduling
Service to Schools

SLIDES

CAI for Educators, IBM

COBOL, IBM

Data Management, IBM

EDP and Accounting Machine Comparison, NCR

Payroll Accounting, UNIVAC

PERT Cost, IBM

Remote Access Computing, IBM

Teleprocessing, IBM

Ten Commandments, NCR

University and College Information System, IBM

360 DOS TOS BOS (Operating Systems), IBM

DATA PROCESSING TERMINOLOGY BOOKLETS AND SOURCES

Communications Dictionary by James F. Holmes, Published by: F. Rider Publisher, Inc., New York, New York

Computer and Data Processing Dictionary and Guide by Jack Horn, Published by: Prentice-Hall, Inc., Englewood Cliffs, New Jersey

Datamation's Glossary of Information-Processing Terms, Datamation, 35 Mason Street, Greenwich, Conn., 06830

Dictionary of Automatic Control by Robert J. Bibbers, Published by: Reinhold Publishing Co., New York, N.Y.

Glossaries for Information Processing, IBM Corporation, White Plains, New York

Glossary of Computer Terminology, Computer Department, General Electric Company, Phoenix, Arizona

Glossary of Terms in Computers and Data Processing, by Edmund C. Berkeley and Linda L. Lorett, Published by: Berkeley Enterprises Inc., Newtonville, Mass.

NOMA Glossary of Automation Terms, National Office Management Association, Willow Grove, Pa.

Pocket Dictionary of Computer Terms, Howard W. Sams and Company, Indianapolis, Indiana

The USA Standard Vocabulary for Information Processing Burroughs Corporation, 6071 2nd Avenue, Detroit, Michigan 48202

The USA Standard Vocabulary for Information Processing Honeywell, Inc., EDP Division, 60 Walnut Street, Wellesley Hills, Mass.

The USA Standard Vocabulary for Information Processing United States of America Standards Institute, 10 East 40th Street, New York, New York 10016

Additional Sources for Data Processing Terminology Booklets

Bell Telephone Laboratories, Murray Hill, New Jersey

Bendix Computer Division, The Bendix Corporation, Los Angeles, California

Business Equipment Manufacturers Association, 235 East 42nd Street, New York, New York 10017

SOURCE ADDRESSES FOR AUDIO-VISUAL AIDS

Audio-visual aids relating to specific computer configurations are available from computer manufacturers. The aids listed and additional information can be obtained from the following sources:

Air Force Film Library Center, 8900 South Broadway,
St. Louis, Mo. 63125

American Management Association, 1515 Broadway, New York,
New York 10036

Arthur Anderson & Company, 1320 West 3rd Street, Los Angeles,
California 90000

Associated Instructional Materials, 600 Madison Avenue,
New York, New York

Audio-Visual Aids for Automation, Bureau of Business and
Economic Research, San Diego State College Foundation,
San Diego, California 92115

Bureau of Audio-Visual Instruction, Extension Division,
State University of Iowa, Iowa City, Iowa

Burroughs Corporation, 6071 2nd Avenue, Detroit, Michigan
48202

Business Education Films, 5113 16th Avenue, Brooklyn, New
York 11204

Data Processing Management Association, International Head-
quarters, 505 Busse Highway, Park Ridge, Illinois

Fifth Army, Central Film Exchange, Fort Sheridan, Illinois

Fortune Films, Time and Life Bldg., Rockefeller Center, New
York, N.Y. 10020

General Electric Company 7800 Wisconsin Avenue, Bethesda,
Maryland 20014

Honeywell, Inc. EDP Division, Waltham, Mass.

IBM Corporation, 590 Madison Avenue, New York, N.Y. 10022
(and Local Offices)

IBM Corporation Film Library 618 S. Michigan Avenue,
Chicago, Illinois 60605

Indiana University, Audio-Visual Center, Bloomington, Indiana 47401

Massachusetts Institute of Technology, Electronic Systems Lab., Cambridge, Mass.

McGraw-Hill Text Films, 330 West 42nd St., New York, N.Y. 10036

Modern Talking Picture Service, 160 E. Grand Avenue, Chicago, Ill. 60611

National Archives and Records Service, National Audio-visual Center, General Services Administration, Washington, D.C. 20409

National Educational Television, 10 Columbus Circle, New York, New York 10019

National Cash Register Company, EDP Division, Dayton, Ohio 45400

National Instructional Films, 58 East Route 59, Nanuet, New York 10954

National Science Foundation, Dr. Howard J. Hausman, Secondary School Program, Washington 25, D.C.

Net Film Service, Audio-Visual Center, Indiana University, Bloomington, Indiana 47401

Norwood Films, 926 New Jersey Ave., N.W., Washington, D.C. 20001

Office of Educational Television, 222 Olson Hall, University of California, David, California 95616

The Pennsylvania State University, Audio-Visual Aids Library, University Park, Pa. 16801

Popular Science Publishing Company, Inc. Audio-Visual Division, 355 Lexington Avenue, New York, New York 10017

Radio Corporation of America, Electronic Data Processing, Sales Department, Camden, New Jersey 08101

Science Electronics, Simon and Ledge Street, Nashua, New Hampshire 03060

Society for Visual Education, Inc. 1345 Diversy Parkway, Chicago, Illinois 606014

U.S. Army Central Film and Equipment Exchange, Army Headquarters, Arlington Hall Station, Arlington, Va., 22200

Unites States Navy, Headquarters of the Commandant, Third Naval District, 90 Church Street, New York, N.Y. 10000

UNIVAC - Division of Sperry Rand Corporation, Audio Visual Aids Department, 315 Park Ave., New York, N.Y. 10010

UNIVAC - Division of Sperry Rand Corporation, Film Library, 1290 Avenue of Americas, New York, N.Y. 10019

Universal Education and Visual Arts, 221 Park Avenue South, New York, New York 10003

University of California, Mr. J. E. Lataena, Film Library Supply, University Extension, 2272 Union Street, Berkeley, California

University of Southern California, Film Distribution Department of Cinema, University Park, Los Angeles, California 90000

3M Company, Visual Products Division, 2501 Hudson Road, St. Paul, Minnesota 55101

EDUCATIONAL, TECHNICAL AND MANAGEMENT SOCIETIES

AMERICAN FEDERATION OF INFORMATION PROCESSING SOCIETIES (AFIPS)

AMERICAN MANAGEMENT ASSOCIATION (AMA)

ASSOCIATION FOR COMPUTING MACHINERY (ACM)

ASSOCIATION FOR DEVELOPMENT OF INSTRUCTIONAL SYSTEMS (ADIS)

ASSOCIATION FOR EDUCATIONAL DATA SYSTEMS (AEDS)

BUSINESS EQUIPMENT MANUFACTURERS ASSOCATION (BEMA)

CAI USERS GROUP

DATA PROCESSING MANAGEMENT ASSOCIATION (DPMA)

INTERNATIONAL FEDERATION OF INFORMATION PROCESSING (IFIP)

INTERUNIVERSITY COMMUNICATIONS COUNCIL (EDUCOM)

SOCIETY FOR AUTOMATION IN BUSINESS EDUCATION (SABE)

SOCIETY FOR MANAGEMENT INFORMATION SYSTEMS

SPECIAL INTEREST COMMITTEE ON CAI (SICCAI)

SYSTEMS AND PROCEDURES ASSOCIATION (SPA)

AMERICAN FEDERATION OF INFORMATION PROCESSING SOCIETIES
(AFIPS)
211 East 43rd Street
New York, New York 10017

AFIPS formed on May 10, 1961 as an outgrowth of the National Joint Computer Committee (NJCC).

AFIPS is a society founded to promote the advancement and dissemination of knowledge of the information processing societies. Membership is open to members of societies engaged in or interested in information processing.

Publications:

The Proceedings of each Joint Computer Conference

AMERICAN MANAGEMENT ASSOCIATION
The American Management Association Building
135 West 50 Street
New York, New York 10020

The American Management Association is a non-profit educational society organized to find, develop and share better methods of management.

It was formed in 1923 through mergers of several small organizations. Membership is open to individuals and firms desiring to take part in AMA's Management Education Programs.

Publications:

- The Management Review
- Management Reviews
- The Managers Letter
- Personnel

ASSOCIATION FOR COMPUTING MACHINERY (ACM)
211 East 43rd Street
New York, New York 10017

ACM, organized in 1947, is perhaps the most technically oriented of all the data processing organizations. It was organized for two purposes: (1) "to advance the sciences and arts of information processing", (2) "to promote the free interchange of information about the sciences and arts of information processing both among specialists and among the public in the best scientific and professional tradition."

Any person or institution having accord with the purposes of the association may obtain membership in one of the three recognized classes: (1) institutional (2) regular, (3) student membership.

Publications:

- Journal of the Association for Computing Machinery
- Communications of the ACM
- Computing Reviews
- Comprehensive Bibliography of Computing Literature

ASSOCIATION FOR DEVELOPMENT OF INSTRUCTIONAL SYSTEMS (ADIS)
Manager of Instructional Systems Marketing
1825 "K" Streetn, N.W.
11th Floor
Washington, D.C. 20036

ADIS was formed to: (1) advance the investigation and utilization of computer-assisted instruction systems, (2) promote the free interchange of information concerning the use of such systems in the best professional and scientific tradition, (3) reduce redundant effort among system users, and (4) specify and present, through cooperative investigation of common needs and problems, requirements and priorities for hardware and software development to the appropriate IBM Corporation offices.

ASSOCIATION FOR EDUCATIONAL DATA SYSTEMS (AEDS)
1201 16th Street, N.W.
Washington, D.C. 20036

AEDS was formed in 1962 as a professional association for educational data processing and information management personnel. Its membership consists of school and university computer centers and officials of state departments of education.

Publications:

AEDS Bulletin
EDP Newsletter
Journal of Educational Data Processing
Monitor

BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION (BEMA)
235 East 42nd Street
New York, New York 10017

Originally organized in 1916 as the Office Equipment Manufacturers Institute, renamed in July, 1961. It represents the business equipment industry and was founded to conduct programs designed specifically for the needs and problems of its members.

Examples of these programs are market research, establishment of standards and the Business Equipment Exposition.

Publications:

News Bulletin

CAI USERS GROUP
For Information Contact:
Mr. Lawrence E. Rosenthal
Chicago Board of Education
Chicago, Illinois

A recently formed organization whose first organizational meeting was held on May 15, 1969. The purpose of the group is to present a defined unified market to both hardware and software vendors interested in CAI. Plans also include centralized dissemination of all available information on CAI to all members.

Charter School districts in the group include: (1) New York Public Schools, (2) Chicago Public Schools, (3) Detroit City Schools, (4) Memphis Public Schools, (5) San Francisco Public Schools, and (6) McComb, Mississippi Schools.

DATA PROCESSING MANAGEMENT ASSOCIATION (DPMA)
524 Busse Highway
Park Ridge, Illinois 60068

DPMA was founded to improve the data processing profession by creating better understanding of the characteristics of data processing. The areas of particular importance are education, dissemination of knowledge, and the proper relationship of data processing to management.

It was founded as the National Machine Accountants Association in 1951. In 1965 the name was changed to Data Processing Management Association to reflect the changes of the role of its members in data processing.

DPMA has 3 classes of membership: Regular membership is open to persons employed in managerial positions in data processing. Associate membership is open to those persons whose occupational activities are related to direct selling of data processing equipment and supplies. Honorary membership can be conferred on persons making certain contributions to the data processing community.

Publications:

Journal of Data Management
DPMA Quarterly

INTERUNIVERSITY COMMUNICATIONS COUNCIL (EDUCOM)

EDUCOM was established a few years ago to aid in applying technology to the educational process.

About 70 major colleges and universities representing 200 campuses are members.

EDUCOM operates from central offices with task forces of experts in the fields of information networks, educational systems, education of professional personnel, clinical operations, legal and related matters.

INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING (IFIP)
345 East 47th Street
New York, New York 10017

IFIP was officially formed in 1960 as a result of a conference, in 1959, sponsored by the United Nations Cultural organization.

The purpose of IFIP is to promote international cooperation in the dissemination of advancement of information processing and the examination of related areas.

Membership is limited to one organization from each country.

Publications:

IFIP Bulletin
IFIP News
Proceedings of IFIP

SOCIETY FOR AUTOMATION IN BUSINESS EDUCATION (SABE)
Dr. E. Dana Gibson, President
Professor of Office Management
San Diego State College
San Diego, CAlifornia 92115

SABE was founded in May 1961 to advance the cause of business education. The areas of involvement are automation, programmed learning, computers, data processing and related areas.

Publications:

SABE Data Processor

SOCIETY FOR MANAGEMENT INFORMATION SYSTEMS
One First National Plaza
Chicago, Illinois

SPECIAL INTEREST COMMITTEE ON CAI (SECCAI)
Association for Computing Machinery
1133 Avenue of the Americas
New York, New York 10036

Free membership to members and non-members of ACM. Non-members may join SICCAI provided one's primary allegiance is to a discipline other than data processing.

SYSTEMS AND PROCEDURES ASSOCIATION (SPA)
7890 Brookside Drive
Cleveland, Ohio 44131

SPA was originally formed in 1944. Through a number of mergers of similar groups, the Systems and Procedures Association was formed.

The purpose of the organization is to give information and exchange ideas relative to systems and procedures. Membership is open to all persons actively engaged in systems and procedures.

Publications:

Systems and Procedures Journal
International Newsletter
Ideas on Management

TECHNICAL JOURNALS AND MAGAZINES

The following is a list of trade magazines, periodicals and technical journals which would be desirable reading material for persons involved in data processing education.

Business Automation, 288 Park Ave., West Elmhurst, Ill., 60168

Communications of the ACM, Association for Computing Machinery, 211 East 43rd Street, New York, New York 10017

Computers and Automation, Berkeley Enterprises, Inc., 815 Washington Street, Newtonville, Mass. 02160

Computer Characteristics Quarterly, Adams Associates, Inc., 575 Technology Square, Cambridge, Mass. 02139

Computer Digest American Data Processing, Inc., 4th floor, Book Building, Detroit, Michigan 48226

Computer and the Humanities (Newsletter), Queens College of the City University of New York, Flushing, New York 11367

Computing Newsletter for Schools of Business, University of Colorado, Boulder, Colorado 80302

Computerworld News Bulletin, Computerworld, Inc., 60 Austin Street, Newton, Mass. 02160

Data Management, 524 Busse Highway, Park Ridge, Illinois

Datamation, F. D. Thompson Publications, Inc., 205 West Wacker Drive, P.O. Box 2000, Greenwich, Conn. 06830

Data Processing Digest, Data Processing Digest, Inc., 1140 South Robertson Blvd., Los Angeles, Calif. 90035

Data Processing for Education, American Data Processing, Inc., 4th Floor, Book Building, Detroit, Michigan. 48226

Data Processing Magazine, Data Processing Magazine, 134 North 13th Street, Philadelphia, Pa. 19107

Data Processor, International Business Machines Corp., White Plains, New York 10601

DPMA Quarterly, Data Processing Management Association, 505 Busse Highway, Park Ridge, Illinois 60068

EDP Analyzer, 134 Escondido Ave., Vista, Calif. 92083

Honeywell Computer Journal, Honeywell, Inc., Electronic Data Processing Division, Wellesley Hills, Mass. 02181

Information Retrieval Letter, American Data Processing, Inc., 4th Floor, Book Building, Detroit, Michigan 48226

Journal of Data Management, Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068

Journal of the Association for Computing Machinery, 211 East 43rd Street, New York, N.Y. 10017

Management Science, P.O. Box 273, Pleasantville, New York

Modern Data Systems, Circulation Department, Modern Data Systems, 120 Brighton Road, Clifton, New Jersey 07012

News Report, News Report, 2101 Constitution Avenue, N.W. Washington, D.C. 20418

SDC Magazine, Document Distribution, SDC

Supervisory Management, American Management Association, Inc., 135 West 50th Street, New York, N.Y. 10020

Systems, United Business Publications, Inc., 200 Madison Avenue, New York, N.Y. 10016

Systems and Procedures, Systems and Procedures Association, 7890 Brookside Drive, Cleveland, Ohio 44138

Technical News Bulletin, U.S. Department of Congress, National Bureau of Standards, Washington, D.C. 20234

Think, IBM, Armonk, New York 10504

EDUCATIONAL JOURNALS

AEDS Bulletin, Association for Educational Data Systems, 1201 16th Street, N.W., Washington, D.C. 20036

AEDS Monitor, Association for Edcuational Data Systems, 1201 16th STreet N.W., Washington, D.C. 20036

Computer and the Humanities, Queens College of the City University of New York, Flushing, New York 11367

EDP Bulletin, Association for Educational Data Systems, 1201 16th Street, N.W., Washington, D.C. 20036

Education Age, 3M Education Press, Visual Products Division, 3M Company, 3M Center, St. Paul, Minnesota 55101

Educational Media, Educational Media, Inc., 1015 Florence Street, Fort Worth, Texas 76102

Educational Technology, Educational News Service, P.O. Box 508, Saddle Brook, New Jersey

Journal of Educational Data Processing, Association for Educational Data Systems, 1201 16th Street N.W., Washington, D.C. 20036

Phi Delta Kappan, Phi Delta Kappan, 8th Street & Union Ave., Bloomington, Indiana 47401

Science, American Association for the Advancement of Science, 1515 Massachusetts Ave., N.W., Washington, D.C. 20005

Scientific American, Scientific American, Inc., 415 Madison Avenue, New York, N.Y. 10017

Todays Education, (formerly NEA Journal), National Education Association, 1201 16th Street N.W., Washington, D.C. 20036

DIRECTORY OF MANUFACTURERS

ADAGE, Adage, Incorporated, 1079 Commonwealth Avenue, Boston, Mass. 02115

AMPEX, Ampex Corporation, Computer Products Division, 9937 West Jefferson Boulevard, Culver City, Calif. 90230

ANAELEX, Anaelex Corp., 150 Causeway Street, Boston, Mass. 02114

AUTONETICS, Autonetics, A Division of North American Aviation, Inc., 3330 Miraloma Avenue, Anaheim, Calif. 92803

BBN, Bolt, Beranek & Newman, Inc., Data Equipment Division, 15808 Wyandotte Street, Van Nuys, California 91406

BECKMAN, Beckman Instruments, Inc., Systems Division, 2400 Harbor Boulevard, Fullerton, Calif. 92631

BIT, Business Information Technology, Inc., 3 Erie Drive, Natick, Mass. 01760

BRYANT, Bryant Computer Products, Div., of Ex-Cello Corp. 850 Ladd Road, Walled Lake, Michigan 48088

BUNKER-RAMO, Bunker-Ramo Corporation, 8433 Fallbrook Ave., Canoga Park, Calif. 91304

BURROUGHS, Burroughs Corporation, 6071 Second Avenue, Detroit, Mich. 48200

COLLINS, Collins Radio Company, Comm. and Data Systems Division, Dallas, Texas 75207

COMPUTER COMMUNICATIONS, Computer Communications Inc., 701 West Manchester Blvd, Inglewood, California 90301

CONRAC, Div. of Giannini Controls Corporation, 600 North Rimsdale, Covina, California 91722

CONTROL DATA, Control Data Corporation, 8100 34th Avenue, S., Minneapolis, Minn. 55420
Control Data Corporation, Data Display Division, 2401 North Fairview Avenue, St. Paul, Minnesota 55113

DATA DISC, Data Disc, Inc., 1275 California Avenue, Palo Alto, California 94304

DATAMARK, Datamark, Inc. Cantiague Road, Westbury, New York
11590

DATAMEC, Datamec Corporation, 345 Middlefield Road, Mountain
View, California 94040

DATA PRODUCTS, Data Products Corporation, 8535 Warner Drive,
Culver City, California 90231

DIGITAL DEVELOPMENT, Digital Development Corporation,
5575 Kearny Villa Road, San Diego, Calif. 92123

DIGITAL EQUIPMENT, Digital Equipment Corporation, Main Street,
Maynard, Mass. 01754

DIGITRONICS, Digitronics, Corp., Albertson Avenue,
Albertson, New York 11507

EAI, Electronic Associates, Inc., West Long Branch, N.J. 07764

EMR, EMR Computer Division, 8001 Bloomington Freeway,
Minneapolis, Minnesota 55420

GENERAL ELECTRIC, Information Systems, 13430 N. Black Canyon
Highway, Phoenix, Arizona 85029

HEWLETT PACKARD, Hewlett Packard, Dymec Division, 395 Page
Mill Road, Palo Alto, Calif. 94306

HONEYWELL, Honeywell, Computer Control Division, Old
Connecticut Path, Framingham, Mass. 01701
Honeywell, Electronic Data Processing Div., 60 Walnut Street,
Wellesley Hills, Mass. 02181

HUGHES, Hughes Aircraft Company, Data Processing Products Div.,
Fullerton, Calif. 92634

IBM, International Business Machines, Corp., Data Processing
Division, 112 East Post Road, White Plains, New York 10600

IDI, Information Displays, Inc., 102 E. Sandford Blvd.,
Mount Vernon, New York 10550

INFORMATION INTERNATIONAL, Information International, Inc.,
200 Sixth Street, Cambridge, Mass. 02142

INTERDATA, Interdata, 2 Crescent Place, Oceanport, N.J. 07757

3

ITT, International Telephone & Telegraph Company, Federal Laboratories, 3700 East Pontiac Street, Fort Wayne, Ind. 46803

LFE, Laboratory for Electronics, Inc., Electronics Division, 1075 Commonwealth Avenue, Boston, Mass. 02215

LSI, Lear Siegler, Inc., Electronic Instruments Division, 714 North Brookhurst Street, Anaheim, Calif. 92803

MIDWESTERN, Midwestern Instruments, Inc., 41st Street & Sheridan Road, Tulsa, Oklahoma 74135

MONROE, Monroe Calculating Machine Co., 555 Mitchell Street, Orange, N.J. 07050

NCR, National Cash Register Co., 1324 South Paterson Blvd., Dayton, Ohio 45400

PACIFIC DATA, Pacific Data Systems, Inc., 644 Young Street, Santa Ana, California 92705

PHILCO, Philco Corporation, Subsidiary of Ford Motor Co., 3900 Welsh Road, Willow Grove, Pa. 19090

POTTER, Potter Instruments Co., Inc., 151 Sunnyside Blvd., Plainview, Long Island, N.Y. 11803

RAYTHEON, Raytheon Corp. 2700 South Fairview Street, Santa Ana, California 92704

RCA, Radio Corporation of America, Information Systems Div., Cherry Hill, N.J. 08034

REMEX, Remex Electronics, 5250 W. El Segundo Blvd., Hawthorne Calif. 90250

ROYTRON, Roytron Division, Royal Typewriter Company, Inc., 150 New Park Avenue, Hartford, Conn. 06101

SANDERS, Sanders Associates, Inc., 95 Canal Street, Nashua, New Hampshire 03060

SCIENTIFIC CONTROL, Scientific Control Corporation, 14008 Distribution Way, Dallas, Texas 75234

SEL, Systems Engineering Laboratories, Inc., Post Office Box 9148, Fort Lauderdale, Florida 33310

SOROBAN, Soroban Engineering, Inc., Post Office Box 1690, Melbourne, Florida 32902

STANDARD COMPUTER, Standard Computer Corporation, 1411 West Olympic Boulevard, Los Angeles, California 90015

STROMBERG-CARLSON, Stromberg-Carlson Corporation, Data Products Division, Post Office Box 2449, San Diego, California 92112

TALLY, Tally Corporation, 13110 Mercer Street, Seattle, Washington 98109

TASKER, Tasker Industries, 7838 Orion Avenue, Van Nuys, California 91409

TEC-LITE, Transistor Electronics Corporation, Post Office Box 6191, Minneapolis, Minnesota 55424

UNIVAC, Sperry Rand Corporation, Univac Division, Blue Bell, Penna. 19422

UPTIME, Uptime Corporation, 15910 W. 5th Avenue, Golden, Colorado 80401

VARIAN DATA, Varian Data Machines, A Varian Subsidiary, 1590 Monrovia Avenue, Newport Beach, Calif. 92660

VERMONT RESEARCH, Vermont Research, Precision Park, North Springfield, Vermont 05150

WESTINGHOUSE, Westinghouse Electric Corporation, Research and Development Center, Pittsburgh, Pa. 15200

APPENDIX C

Teaching Materials Utilized

Phase One - General Background and Programming

Evolution of Data Processing

(1) Films:

Then and Now produced by Univac.

(2) Programmed Instruction Texts and Glossaries:

An Introduction to Computer Numbering Systems, A Programmed Instruction Text; distributed by Honeywell.

Computing System Fundamentals, a Programmed Instruction Text; developed by IBM.

Text and Notebook, Unit I. Series consists of six texts and two notebooks. Each successive text was distributed upon the completion of the previous one throughout Phase I of the curriculum.

U.S.A. Standard Vocabulary for Information Processing, a glossary; distributed by Honeywell, Inc.

(3) Overhead Projection Transparencies:

Selected Transparencies from Volume 4, Data Processing Visuals by the Minnesota Mining and Manufacturing Company, were used throughout Phase I of the curriculum.

(4) Supplementary Handouts:

Project EDITS - Purpose of the project

Binder and Supplies

CAI - High School Time Sharing System; Altoona, Pa. School District: System Spotlight; extracted from Datamation, January, 1969.

Data Representation and Management

(1) Programmed Instruction Texts:

Computing Systems Fundamentals, IBM Units II - VI distributed as required.

(2) Overhead Projection Transparencies:

Selected Transparencies from Volume 4, Data Processing Visuals. Minnesota Mining and Manufacturing Company.

(3) Supplementary Handouts:

Sample punched cards
USA Standard Code for Information Exchange (USACII)
Numbering Systems Exercises

Concepts of Data Processing Hardware

(1) Slides:

IBM 360 - 30 Tape/Disk Computer Installation developed by InTech Corporation

(2) Overhead Projection Transparencies:

Selected Transparencies from Volume 4, Data Processing Visuals - Minnesota Mining and Manufacturing Company.

(3) Programmed Instruction Texts:

Computing System Fundamentals: IBM, Units II - VI distributed as required.

(4) Supplementary Handouts:

How The Computer Gets the Answer: Life Educational Reprint 33.

Concepts of Data Processing Software

(1) Films:

The Information Explosion - Association of Science Teachers.

(2) Programmed Instruction Texts:

Computing Systems Fundamentals, IBM. Units II-VI distributed as required.

(3) Supplementary Handouts:

Sample Program Listing.

Computer Processing Techniques

(1) Films:

Operating System 360 - Modern Talking Pictures

(2) Overhead Projection Transparencies:

Selected Transparencies from Volume 4, Data Processing Visuals; Minnesota Mining and Manufacturing Company.

(3) Programmed Instruction Texts:

Computing System Fundamentals: IBM Units II - VI distributed as required.

Decision Making Techniques

(1) Overhead Projection Transparencies:

Selected Transparencies from Volume 4, Data Processing Visuals; Minnesota Mining and Manufacturing Company.

(2) Programmed Instruction Texts:

Computing System Fundamentals: IBM. Units II - VI distributed as required.

(3) Supplementary Handouts:

Sample Flow Chart - Departing for Work
"Job Processing" Flowchart
Flowcharting Worksheet - IBM
Flowcharting Template - Honeywell
EBCDIC Card - RCA
Announcement of Speaker - Dr. R. Louis Bright
Review Sheet of Data Processing Terms

COBOL Programming

(1) Texts:

Fundamentals of COBOL - Programmers Reference; Sperry Rand.

COBOL - Student Workbook - Intermediate Course; Sperry Rand.

COBOL - Instructors Guide - Intermediate Course; Sperry Rand.

General Formats - COBOL 65; Sperry Rand.

(2) Supplementary Handouts:

Systems Flowchart and Program Flowchart - Examples
COBOL Program - Coding
COBOL Coding Form
Reference Sheets - Identification, Environment and Data Divisions
Sample Program Listing of Identification, Environment and Data Divisions.
Laboratory Problem
Laboratory Problem #4 and Printer Layout
Problem Solution #4
Laboratory Problem #5
Reference Sheet - Verbs
List of Technical Journals and Magazines
Solution to Laboratory Problem #5.
Editorial: Book 977 Where are you? extracted from Modern Data, January, 1969.

Laboratory Problem #6 - Indian Problem
Laboratory Problem #13 - Customer File Conversion
Flowchart for Laboratory Problem #13
Laboratory Problem #7
Flowchart for Laboratory Problem #7
Solution to Laboratory Problem #7
Sample Coding for Page Headings
Listing of Test Data for Laboratory Problem #13
Laboratory Problem #8 - Perform and Subscripting
Solution to Laboratory Problem #8.

Phase Two - Techniques and Applications

Data Processing Systems and Procedures Concepts

(1) Overhead Projection Transparencies:

Pertinent Transparencies developed by InTech Corporation

(2) Supplementary Handouts:

Manual Grade Reporting System - Flowchart
EDITS Newsletter - Vol. 1, No. 1
Systems Analysis and Design - Payroll System

Integration of Systems and Programming

(1) Overhead Projection Transparencies:

Transparencies of supplementary handouts #3 - #20 described below; developed by InTech Corporation.

(2) Supplementary Handouts:

Voter Registration Background - Supplement #1
Voter Registration Specifications - Supplement #2
Voter Registration; Initial Master File - Supplement #3
Voter Registration Conversion System - Supplement #4
Voter Registration Conversion File - Supplement #5
Voter Registration Pre-Election System - Supplement #6
Voter Registration Election System I - Supplement #6-B
Voter Registration Election System II - Supplement #7

Voter Registration: Revised Master File - Supplement #8
Voter Registration Post Election System I - Supplement #9-A
Voter Registration Post Election System II - Supplement #9-B
Voter Registration Post Election System III - Supplement #10
Transaction Files Layout - Supplement #11
Update Register - Supplement #12
Street List - Supplement #13
Recap File - Supplement #14
Recap Report - Supplement #15
Certificate Form Layout - Supplement #16
Final Recap Report - Supplement #17
Purge Notice Layout - Supplement #18
Retention and Inspector Purge Card Files - Supplement #17
Retention Report - Supplement #20

Practical Applications in Industry

(1) Overhead Projection Transparencies:

Transparencies of selected handouts of group described below; developed by InTech Corporation.

(2) Supplementary Handouts:

Outline for a Systems Study
Review Sheet - Systems and Procedures
Current Sales Report - Handout #1
Monthly Salesman and Territory Report - Handout #2
Sales Statistics System Flow Chart - Handout #3
Record Layout for Salesman Transaction - Handout #4
Detail Flowchart for Sales Report Program - Handout #5
Inventory Shipment Report - Handout #1
Inventory Status Report - Handout #2
System Flow Chart - Daily Inventory Processing - Handout #3
Inventory Shipment Program - Detail Flow Chart - Handout #4
Inventory Status Program - Detail Flow Chart - Handout #5
Payroll Register - Handout #1
Payroll Check - Handout #2
Payroll Master File - Handout #3

Earnings File Record Layout - Handout #4
Payroll System Flow Chart - Handout #5
Nationwide Trucking System - Handout #6

Practical Application in School Administration

(1) Overhead Projection Transparencies:

Transparencies of handouts selected from group described below; developed by InTech Corporation.

(2) Supplementary Handouts:

Daily Absence Report - Handout #1
State-Required Attendance Report - Handout #2
Irregular Attendance Report - Handout #3
System Flow Chart - Attendance Accounting - Handout #4
Student Report Card - Handout #1
Mark Analysis Report - Handout #2
Grade Reporting Systems Flow Chart - Handout #3
Census Change Register - Handout #1
Alphabetical List of Students by School Report and Pre-School Children by Birthday - Handout #2
System Flow Chart of School District Census Processing - Handout #3

Advanced Class Problem

(1) Opaque Projection Materials:

Projections of systems and reports designed by groups of participants.

(2) Supplementary Handouts:

Advanced Class Problem - Handout #1
Advanced Class Problem - Handout #2

Information Retrieval

(1) Films:

Information Retrieval - Modern Talking Pictures
(Now withdrawn from circulation)

(2) Overhead Projection Transparencies:

Developed by InTech Corporation as follows:

Concept of Information Retrieval
Data Base Systems
Management Information System (MIS)
MIS Data Base
Management Information System Utilization
MIS Summary of Objectives
MIS - Levels of Data Base
Levels in Grade Reporting System
MIS - Specialized Data Bases
MIS - Information Threshold Problem 1.
MIS - Information Threshold Problem 2.
MIS - Information - Sources and Amounts
MIS - Information
Sample KWIC Index
Permutations in Establishing a KWIC Index
UNITERM CArds
Information Flow in SDI System
Microimage Forms
Datrix Form
Question - Answer System - Constituent Analysis
Question - Answer System - Dependency Agreement
Question - Answer System - Phrase Structure Analysis
List Structure Example
File Management System - Mark IV
IR System: State-of-the-Art - Input and Announcement
IR System: State-of-the-Art - Search and Retrieval

(3) Supplementary Handouts:

Stock Broker Video Display
List of Educational Journals
List of Technical Journals and Magazines
Attendance Accounting Subsystem - Flow Chart
California Total Educational Information System
Pupil Personnel System Flow Chart
Guidelines to Selection, Design, etc. of the
  Individual Problem

Phase Three - Advanced Applications to Individual Disciplines

Concepts of CAI - CMI

(1) Films:

Sign On/Sign Off - Pennsylvania State University

(2) Overhead Projection Transparencies:

Developed by InTech Corporation as follows:

Teaching Machines
Normal Classroom Relationship between Student, Text & Teacher
Teacher, Student, Text Interaction in CAI Situation
Basic Tasks to be Approached in Developing a CAI System
CAI in the Universities
Stanford Upper - Elementary Mathematics CAI Project
Drill and Practice CAI Program in Spelling - Flowchart #1
Drill and Practice CAI Program in Spelling - Flowchart #2
Schematic of a Typical CAI System Configuration
"Rich" System Configuration for CAI
Schematic Representation of a System for CMI
Example of PLANIT - CAI Author Language
Example of LYRIC - CAI Author Language
Sample CAI Drill & Practice Program in Elementary English
Sample CAI Drill & Practice Program in Arithmetic
CAI Daily Teacher Status Report
Performance of Three Experimental Groups - Evaluation of CAI
Reading Progress with CAI - Progress
Reading Progress with CAI - Rate of Progress
CAI Reading Project - Test Results

(3) Supplementary Handouts

CAI Spelling Program - Flowchart #1
CAI Spelling Program - Flowchart #2
PLANIT - A Language for CAI

Selection of a Computer

(1) Overhead Projection Transparencies:

Developed by InTech Corporation as follows:
Equipment Characteristics by Vendor
Evaluation Attributes and Rating Scales - Numerical
Evaluation Attributes and Rating Scales - Alphabetical
SCERT System
SCERT System Environment Definitions
SCERT Sample OUtput #1
SCERT Sample Output #2
Graph-Purchase vs. Lease Costs

(2) Supplementary Handouts:

Proposals of Three Computer Vendors
Decision Table on Computer Selection

Data Processing Teaching Aids

(1) Supplementary Handouts:

Sources for Data Processing Terminology Booklets
Filmstrips (List)
Films (List)
Source Addresses for Audio-Visual Aids
Directory of Manufacturers
Educational, Technical and Management Societies
Reference Information

Current Applications in Education

(1) Texts, Technical Magazines and Journals:

Selected articles researched by participants and used in discussion.

Individual Problem

(1) Supplementary Handouts:

Individual Problem Implementation and Documentation - Guidelines.

APPENDIX D

Selection of a Computer

Vendor Proposals

The following is a summary of proposals, prepared by a consultant, from three computer manufacturers. Evaluate these proposals according to the guidelines presented in the equipment evaluation section. There are two desired results:

1. Choice of vendor
2. Justification of choice

The jobs for which the computer is initially being purchased are listed below:

1. Payroll
2. Pupil Census
3. Student Scheduling
4. Mark Reporting
5. Failure Analysis and Reporting
6. Budget and General Accounting
7. Dropout Analysis and Reporting

The School District has estimated the above jobs will take 12 months to implement. Upon completion they will begin to implement computer assisted instruction from remote locations, using 60 visual display terminals.

The following is a summary of each vendors proposal:

VENDOR I

I. HARDWARE

A. CPU

1. 8,000 characters of core memory
2. 4.0 micro-second memory cycle
3. Decimal arithmetic
4. No multiply/divide hardware (software available)
5. Financial edit feature
6. No read/write/compute simultaneity

B. 800 CPM Card Reader

C. 400 CPM Card Punch

D. 350 LPM printer with 120 print positions

E. Sorter, Collator, Interpreter, Reproducer

This vendor proposes to sell a card system initially and to upgrade this in one year to a more sophisticated system with tape, disk, and communications capabilities, which would not have program compatability. The vendor feels the advantage of this system is low initial rental.

II. LANGUAGES

Basic Assembler Language

III. DATA MANIPULATION ROUTINES

A. Limited peripheral conversion routines

B. Macro routines

IV. OPERATING SYSTEM

None available on cards

V. PROGRAM MAINTENANCE AND DEBUGGING AIDS

A. Memory dump routines

B. Cross reference routines

VI. APPLICATIONS SOFTWARE

None available

VII. SYSTEMS SUPPORT

Experienced personnel in an advisory capacity

VIII. SERVICE SUPPORT

Trained personnel with service rendered on an "on-call basis"

IX. EDUCATION SUPPORT

There are several formal classes and seminars available for management and programming personnel. There are no formal classes for operations personnel.

There are several excellent Programmed Instruction courses available for programming and operations personnel.

All formal education is done in the regional education center, one hundred miles away.

The quality of the teaching personnel is generally high.

X. SOFTWARE DISTRIBUTION

Direct from home office, by request.

XI. REFERENCE MANUALS

Extremely technical but complete, distributed directly to user.

XII. COSTS PER MONTH FOR 200 MACHINE HOURS - $2,875.00

A. System is upgraded with additional monthly rental.

B. System cannot be down-graded during length of contract.

C. Overtime will be all usage in excess of 200 machine hours.

Overtime Charge ... $10.50 per hour

VENDOR II

I. HARDWARE

A. CPU

1. 32,000 characters of memory
2. 800 nanosecond memory cycle
3. Decimal arithmetic

4. Binary airthmetic
5. Multiply/divide hardware
6. No financial edit (software available)
7. Complete read/write/compute simultaneity
8. Communications interface

B. 1100 CPM Card Reader

C. 250 CPM Card Punch

D. 1100 LPM Printer with 132 Print Positions

E. 3-12 million character disk drives - 180 KB
(1 drive for operating system)

F. 4 input/output channels

G. 4-800 BPI tape drives - 67KB

This vendor proposes a system that will handle the current jobs more efficiently as the additional jobs are implemented. He feels the additional cost for the first twelve months is offset by having the largest volume of information on tape rather than cards. The disk drives are justified by the use of a more advanced operating system and allow the programmers to gain disk experience. The required communications abilities are a standard feature of this computer.

II. LANGUAGES

A. Basic coding language

B. COBOL 68'

C. ForTran IV

D. Algol

III. DATA MANIPULATIONS ROUTINES

A. I/O control systems

B. Sorts/collates/merges

C. Macro assemblers

D. Some peripheral conversion routines

E. File maintenance routines

IV. OPERATING SYSTEMS

A. Tape resident - adequate, requires 5,000 characters of memory

B. Disk resident - rated excellent by users however requires 8,000 characters of overhead.

V. PROGRAM MAINTENANCE AND DEBUGGING AIDS

A. Symbolic program maintenance

B. Object program maintenance

C. Trace routines

D. Memory and peripheral print routines

VI. APPLICATIONS SOFTWARE

A. Very good library of payroll and general accounting packages including accounts receivable and payable.

B. Excellent student scheduling packages

C. Written in COBOL primarily with some of the inventory programs in ForTran

VII. SYSTEMS SUPPORT

Experienced personnel, with one man committed a full year, for programming and systems support.

VIII. SERVICE SUPPORT

Trained personnel available on call

IX. EDUCATION SUPPORT

Numerous formal classes for management programmers and operators. There are several programmed instruction courses for all Data Processing personnel.

Formal education available:

A. Home Office

B. Regional Education Centers

C. Branch Offices

D. Customers Offices

X. SOFTWARE DISTRIBUTION - distributed upon request by user.

XI. REFERENCE MANUALS

Well written and easy to understand

XII. COSTS PER MONTH FOR UNLIMITED USE - $4,300.00

A. System can be upgraded with additional monthly rental

B. System can be downgraded, by paying a pro-rated share of the total contract rental.

VENDOR III

I. HARDWARE

A. CPU

1. 32,000 characters of memory
2. 1.0 micro-second memory cycle
3. Decimal Arithmetic
4. Binary Arithmetic
5. Multiply-divide hardware
6. Financial edit
7. Complete read/write/compute simultaneity

B. 800 CPM Card Reader

C. 200 CPM Card Punch

D. 600 LPM printer with 132 print positions

E. Two Input/Output channels

F. Five - 800 BPI tape drives - 89KB

This vendor proposes that he can satisfy the work load requirement with five tape drives. He states he does not feel there is a need for random access devices now and proposes that the disk drives not be added for one year. This, he states, will permit a lower hardware rental for the first year, without affecting efficiency. To allow communications a special feature must be installed at an additional monthly charge of $100.00.

II. LANGUAGES

A. Basic Coding Language

B. COBOL 68'

C. ForTran IV

III. DATA MANIPULATION ROUTINES

A. I/O control systems

B. Sorts/merges/collates

C. Macro assemblers

D. Library of peripheral conversion routines

E. File maintenance routines

IV. OPERATING SYSTEMS

A. Tape Resident - good, requires 5,000 characters of memory

B. Disk Resident - fair, requires 10,000 characters of memory

V. PROGRAM MAINTENANCE AND DEBUGGING AIDS

A. Symbolic program maintenance

B. Object program maintenance

C. Trace routines

D. Cross reference routines

E. Memory dump

F. Peripheral print

G. Flow chart program

VI. APPLICATIONS SOFTWARE

A. An excellent library of payroll and general accounting packages including accounts receivable and payable.

B. Written primarily in Assembler Language

VII. SYSTEMS SUPPORT

One full-time experienced systems engineer for one year

VIII. SERVICE SUPPORT

Full time trained engineer "on site", with one hour response for additional specialized support

IX. EDUCATION SUPPORT

Numerous formal classes for programmers and operators, at the regional education centers. There are several Programmed Instruction Courses available for all Data Processing personnel.

X. SOFTWARE DISTRIBUTION

A. System engineers responsibility, distributed by home office.

XI. REFERENCE MANUALS

Technically written, difficult to understand

XII. COSTS PER MONTH FOR 200 MACHINE HOURS - $3,200.00

A. System is upgraded with additional monthly rental

B. System can be downgraded by paying a "one-time" service charge and a pro-rated share of the total contract rental.

Selection of a Computer

DECISION TABLE ON COMPUTER SELECTION

	ELEMENT	VENDOR #1	VENDOR #2	VENDOR #3
I.	HARDWARE			
II.	LANGUAGES			
III.	DATA MANIPULATION ROUTINES			
IV.	OPERATING SYSTEMS			
V.	PROGRAM-MAINTENANCE AND DEBUGGING AIDS			
VI.	APPLICATIONS SOFTWARE			
VII.	SYSTEMS SUPPORT			
VIII.	SERVICE SUPPORT			
IX.	EDUCATION SUPPORT			
X.	SOFTWARE DISTRIBUTION			
XI.	REFERENCE MANUALS			
XII.	COST			

KEY
E - EXCELLENT
G - GOOD
F - FAIR
P - POOR
N/A - NOT APPLICABLE

APPENDIX E

Selection of a Computer - Laboratory Results

Joseph Beltrami

I. Description of Proposed System
  A. Initial purpose
    1. Payroll, pupil census, student scheduling, grade reporting, failure analysis and reporting, budget and general accounting dropout analysis and reporting.
  B. Future System Additions:
    1. Computer assisted instruction, using 60 visual display terminals.
    2. Time target date for implementation of CAI is immediately upon computerization. Initial purpose jobs -- approximately one year.

II. Choice of Vendor
  A. Vendor #2.

III. Justification of choice:
  A. Education technique (see attached schedule "A").
  B. Specific reasons for choice.
    1. Equipment Provisions and Systems Operations.
    A. Vendor #2 achieved highest score per evaluation schedule.
    B. Vendor #2 is providing (3) 12 million character disk drives for immediate use, with tape drives as well.
    C. While providing only four tape drives, vendor #2 more than adequately fares out well by the disk drives (vendor #3 provides 5 tape drives but no disk drives for immediate use).
    D. Card Reader, Card Punch, and Printer operate at highest speeds of all vendors.
    E. Vendor #2 has highest number of I/O channels, an important consideration for future use, especially with CAI intentions.
    F. Vendor #2 has fastest memory cycle time.
    G. While vendors #2 and vendor #3 both utilize the all-important COBOL and FORTRAN IV languages, vendor #2 also has ALGOL.
    H. Disk resident operating system of vendor #2 requires 8,000 chs. of overhead, which is 2,000 chs. less than the other vendors provided. However, because of large core storage provided by both vendors #2 and #3, this is not a major factor.
    I. Vendor #2 offers student scheduling program in addition to programs offered by other vendors; #2's programs are written basically in COBOL with some inventory programs in

FORTRAN, while next best vendor offers programs only in Assembler Language.

J. Systems Support is good, although another vendor offers nearly a just-as-good systems support.

K. Service Support is good and is similar to vendor #3's.

L. Educational Support is excellent and provides instruction to all data processing personnel at any location desired.

M. Reference manuals are well-written and easy to understand; however, assuming capable personnel are utilizing the system, technical manuals as provided by #3 represent no drawback.

2. Cost reasons for choice:

A. See attached Schedule "B".
  1. Assuming Vendor #1 does not provide the equipment needed to efficiently achieve the desired results.
  2. Assuming no positive use.

B. Schedule "C".
  1. Assuming 20 hours of overtime per month.
  A. Approximately one overtime hr. per day.

(TABLE)

C. While the 3rd vendor offers a package quite similar to the 2nd vendor and the package of #3 is less expensive than that of #2. (assuming not more than approximately 400 overtime hrs.) #2 can easily cut time and make up the rental cost spent over and above that of #3.

NOTE:
If budget requirements demand that not more than $40,000 be spent on the computer for at least the first year then #3 vendor should be given considerable thought, particularly if choosing #2 would be turned down by the budget committee. (This means that #3 would enable the data processing function to begin immediately while #2 means that the function would be postponed for a year.

D. Reasons for rejecting #1 & #3:
  1. #1 provides no tapes or disks, yielding stored output only on punched cards.
  2. Core of number 1 does not make it a feasible operation after the first year when CAI is implemented.
  3. #3 leaves no provision for heavy overtime usage as far as cost is concerned. As well, it does not provide ready accessibility to disk process. This may be

a factor if maximum regular time is used, because tape is considerably slower than random access, such as disk.

4. #3 leaves little time for rental of computer to other companies wishing to make use of it.

Maryann Berger

I. Description of Proposed System:

The computer purchased will be used to perform the following functions:

Make up the payroll, conduct a pupil census, do student scheduling, mark reporting, failure analysis, budget and general accounting, and drop-out and analysis reports. At a later date 60 visual display terminals will be added to the basic configuration.

II. Vendor Selected:

My choice of proposed systems will be that of Vendor II.

III. Justification:

A. To determine a choice a scale was set up listing attributes desired in the system. Each attribute was given a weight from 0 to 4 depending upon the importance of that system. Each system was then evaluated on each attribute and given a point scale ranging from 0 to 100.

Following is the rating scale used:

(Rating scale)

B. As can be seen from the above chart, in areas I considered of basic importance, Vendor II had more to offer than the other proposed systems. I felt that system II had more to offer in long-range goals also. Although the system had no financial edit, I felt that this could be overcome through the use of available software. Also having the communications facilities available as part of the basic configuration will make it much easier to use or add student terminals without much revision of the system. Also the disk drives will be available and much faster and make information more readily available because of random access. These will be necessary for later CAI programs. This system will allow for greater expansion without much additional cost. Also less storage space will be needed by having most information on tape.

C. The other two proposals were rejected because I felt that they did not meet the basic objectives as well as did the accepted proposal although both had certain good points, they were rejected purely on the terms of number of points. Proposal II simply won the numbers race.

Vendor I was simply deficient in too many of the basic requirements. It was much slower than the other two systems. Also lacking a read, write, compute simultaneity, will necessitate more computer time spent on these operations and a resulting higher cost. Also a card system is not the best method of record keeping. Also it is not adaptable for CAI.

Vendor III was rejected because it was not as fast as the selected system. Also costs will be added when it becomes necessary to add disk packs for the CAI program. Secondly, it did not allow or have available as many languages. Although good, it was not as good as proposal II.

Imelda Brislin

A school district is considering the purchase of a computer to do the following:

1. Payroll
2. Pupil Census
3. Student Scheduling
4. Work Reporting
5. Failure Analysis and Reporting
6. Budget and General Accounting
7. Dropout Analysis and Reporting

Twelve months will be required for implementation. Upon completion computer assisted instruction will be implemented from remote locations, using 60 visual display terminals.

In the evaluation of a computer, one looks for high-speed processing, efficiency of operation and reasonable going rates for this service. The equipment must be able to perform the 7 functions listed above, plus having the memory capacity to accomodate a projected CAI program. It is assumed that personnel must be trained by the manufacturer for the new installation. Systems personnel and programmers presumably are experienced persons trained in this field, who must be given adaptability instruction by the manufacturer on this particular installation.

Vendor II, in assessment of qualities, received the highest number of points. Vendor III was comparable in performance, but II could read and print much faster. Vendor I contained a very small core memory and could not handle the number of programs, plus CAI that were contemplated. No further consideration could be given to this vendor or any other attributes. It would then narrow down to Vendors II and III.

At this stage of evaluation, a lay person, such as I, cannot realistically judge the value of using disk drives in a year or having an engineer "on site" as opposed to being able to have one "on call" to reach me from a point about 2 or 3 hours away. As it is with all equipment, when it's working smoothly, an engineer (service) is not needed -- until something goes wrong. Good service is a "must", so the manufacturer or service call cannot be too far away.

Vendor II lists only one more high-level language than III (Algol). I don't know of what importance this might be.

Data manipulation routines were very similar.

Vendor III offers many more maintenance and debugging aid - certainly an aid if one needed to use those offered - of no use or advantage if they are available but not needed.

Software: Advantage of high-level languages; otherwise similar.

Systems support referred to previously. A great aid to have a person on the job for programming and systems aid.

Service: already mentioned.

Education: Both offer educational instruction, but Vendor II seems to offer courses in more places.

Software Distribution - available from both (this was not too clearly listed for advantages).

Reference Manuals: I'm sure Vendor II's, which is well written and easy to understand would be an important feature.

Cost: Extremely hard to evaluate if one is not the user and not in the specific buying school district. Systems, or anything else, which do more, cost more. If it does the job, one must pay the money. What do we get for it? Unlimited use for $4,300 with a chance to rent time to other users.

Overtime charge on III is $20 an hour -- a consideration in the amount or volume of work contemplated. An additional charge of $1,000 a month for two disk drives to be added at the end of a year is a consideration.

John Cardone

I. Description of proposed system and objectives:

It was decided that the School District would convert to a system which would do specific operations and reports: payroll, pupil census, student scheduling, mark reporting, failure analysis and reporting, budget and general accounting and dropout analysis and reporting.

It was then necessary to also decide in a prescribed manner what hardware and software as well as maintenance and cost should be considered before accepting a final choice. The entire operation would take 12 months to implement and at which time there would be 60 visual display terminals.

II. Choice of Vendor - Vendor #2 proposed a system that not only handled current jobs but also will handle new ones as they occur.

III. Justification of Choice.

A. Evaluation technique; There were 12 listed attributes each graded according to a weighted marking system of E=4, G=3, F=2, P=1, N/A=0.

B. Specific reasons for choice.

He seems to handle current jobs most efficiently in the overall picture and also is ready to add new jobs as they are needed.

He shows a comparison of savings in first year cost by an overall savings of material on tape (better in the long run).

He also brings in disk drives as needed by employees to implement systems growth. This is more logical for consolidation of schools.

There are excellent student schedule packages available.

There are several programmed instruction courses available.

Software is distributed by request.

A good library of payroll and general accounting written in COBOL primarily with some Fortran.

C. Summary of rejection.

I. a) Not compatible with future problem.

b) Problems on debugging will run into higher costs.

c) Language is limited and can program them in this same limited language.

d) A card system first and then to tape will be double work.

6) Core memory too small.

Summary of rejection of:

III. a) Cost in the long period of time will be very high.

b) Systems of operations not as good as #2.

c) Additional cost of overtime is great.

d) Reference manuals are difficult to use and lack of your own trained personnel is costly.

e) Memory cycle slower than #2 Vendor

f) Educational Support Systems is not as good as #2 vendor.

Maurice Cardone

I. Description of proposed system and objectives:

The system required is to produce the following reports:

1. Payroll
2. Pupil Census
3. Student Scheduling
4. Mark Reporting
5. Failure Analysis Reporting
6. Budget and General Accounting
7. Dropout Analysis and Reporting
8. Implementation of 60 terminals for CAI.

The equipment desired will accomplish our objectives with the least amount of cost and time to school district and produce reports that will assist the administration in evaluating student ability to the highest degree and keep costs within or below our school budget.

II. Choce of vendor: Vendor "B"

III. Justification of Choice:

a. Computer evaluation: Twelve attributes were graded by letter: E - G - F - P - N/A. A weight was assigned to each letter. E - 4, G - 3, F - 2, P -1, N/A - 0.

The hardware attribute was broken down into eight categories and were graded by letter.

b. The system proposed by vendor "B" would handle current jobs more efficiently and would be able to implement additional jobs efficiently and quickly. Disk drives seem more logical because of the continued consolidation of school districts and the continued increase in student enrollments. With the immense amount of information on tape alone, more time would be consumed to produce reports. Applications software supplied by vendor "B" are made to order for the types of reports and objectives of our school district. The unlimited use of at least 4 languages makes it possible to get the best possible software programs to reach our objectives. The education support is excellent with formal education available at various sources. Well written and easy to understand manuals will make it easier to program with less error, thus saving time and money.

c. Summary of reasons for rejection:

Vendor "A"

1. Core memory small - too slow.
2. Low initial rental in fact will cost more in the long run because card system must be updated.
3. Limited language usage.
4. No application software available.
5. Systems support poorer than vendor "B".
6. Education support too distant.

Vendor "C"

1. Memory cycle slower than "B".
2. Operating system not as good as "B".
3. Educational support not as good as "B".
4. Overtime charge is almost double that of "B".
5. Manuals are too technical - this may cause errors in programming.
6. Cost of two more disk drives will up cost another $1,000.

Summary:

Although cost of "B" is more than either "A" or "C" the upgrading of System "A" after the 1st year will increase rental at least $1,000. The addition of 2 disk drives in system "C" will increase the rental of "C" by $1,000. System "B" might still cost more but the speed - Educational help, etc. would compensate for this.

L. C. Evangelista

I. As listed in the problem presented, the equipment the school district will purchase is to be used primarily for the teaching of data processing in our new vocational-technical school from the hours of 8:30 to 3:30. However, since this equipment is costly, we wish to use it as much as possible during prime time and secondary time to schedule our classes in the three high schools, six junior high schools and twenty one elementary schools. In addition, we would use it for payroll, pupil census, mark reporting, failure analysis and reporting, budget and general accounting, dropout analysis and reporting, plus purchasing, supplies and inventory, accounts payable and receivable, maintenance, cafeteria accounting, instructional materials records, personnel, registration, and eleven miscellaneous uses, and also for computer assisted instruction if possible, by means of terminal jacks throughout the buildings in the school district.

II. My choice of vendor is at this point number 3, however, this is a tentative choice because Number 2 vendor is very close to being successful and a second look and evaluation must be needed before a final selection is made. This involves too much money for an immediate decision. I wish further study.

III. Justification

a. My evaluation technique use is rating the different attributes as excellent, good, fair and poor. Each category respectively, was rated 4, 3, 2, and 1.

b. My final choice will be decided on a further evaluation of vendor B and Vendor C in the following categories:

I	Hardware	18	14
II	Language	4	3
III	Data Manipulation Routines	4	3
IV	Operating Systems	3	4
V	Programming Debugging Aids	3	4
VI	Application Software	3	4
VII	Systems Support	3	4
VIII	Service Support	3	4
IX	Education Support	2	4
X	Software Support	2	4
XI	Reference Material	4	3
XII	Cost/Month	4	4

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V	Programming Debugging Aids	3	4
VI	Application Software	3	4
VII	Systems Support	3	4
VIII	Service Support	3	4
IX	Education Support	2	4
X	Software Support	2	4
XI	Reference Material	4	3
XII	Cost/Month	4	4

In the twelve categories listed above, Vendor B rates higher in 4 categories and is equal in one category.

Vendor C rates higher in 7 categories, is equal in one category.

c. After a further look into the situation, I decided to recommend to the board of education to lease the equipment for five years from Vendor C for I feel that in the next five years the development of computers through research will be tremendous and financially the cost will decrease such that the taxpayers of our community can afford to buy the equipment outright.

William J. Ewasko

I. The proposed system will be used for the following jobs:

1. Payroll
2. Pupil Census
3. Student Scheduling
4. Mark Reporting
5. Failure Analysis & Reporting
6. Budget & General Accounting
7. Dropout Analysis & Reporting
8. Computer Assisted Instruction

II. Choice of Vendor

Vendor II

III Justification of Choice

a. Computer evaluation technique used (See attached worksheet).
b. Specific reasons for choosing Vendor II:
   1. After providing for all operating systems Vendor II's Computer had the largest core storage left.
   2. C.P.U. had nanosecond memory cycle and best hardware.
   3. Languages were varied - hence could be used in different type jobs.
   4. Data Manipulation Routines excellent.
   5. Operating Systems rated excellent.
   6. Program Maintenance and debugging aids excellent.
   7. Applications Software - Vendor II has a vast library of software to call on. School District will need this.
   8. Systems Support from Vendor II is good-one man committed a full year.
   9. Service Support - trained personnel available on call.
   10. Education Support excellent - formal education available home office, Regional Education Center, Research Offices or customer's offices.
   11. Software distribution is good.
   12. Reference Manuals are well written and easy to understand.
   13. Costs per month for unlimited use - $4,300. - Important consideration because school district upon completion of 7 basic jobs mentioned plans

to implement computer assisted instruction using sixty visual display terminals. Adult Education at night could bring cost down also.

c. Vendor I was rejected for the following reasons:

1. Hardware configuration rated only fair in comparison with Vendors II and III.
2. Only had basic Assembler Languages.
3. Data Manipulation Routines rated fair.
4. Operating System - rated zero.
5. Program maintenance and debugging aids only fair compared to Vendors II and III.
6. Systems support rated fair.
7. Service Support rendered on an "on call" basis.
8. Educational Support - all formal education 100 miles away.
9. Reference Manuals extremely technical. Would be of little or no use to type of personnel the school district would have.
10. Overtime charged on every hour over 200 system cannot be down-graded during length of contract.

Vendor III was rejected for the following reasons:

1. Reference manuals technically written, difficult to understand.
2. Applications software primarily in assembler language.
3. Overtime charged for all hours over 200 at rate of $20. per hour plus two disk drives will be added at additional monthly rental of $500. per drive. School District with CAI application will go over 200 hours.
4. Education Support rated good in comparison to excellent for Vendor II.
5. Operating System rated good compared to excellent for Vendor II.

Sebastian Gattuso

I. Description

The machine is being purchased so that it will be able to handle a maximum work load and perform to its greatest capacity, that is; perform different functions at the same time. It will have to be programmed to handle payroll pupil census, student scheduling, mark reporting, failure analysis and reporting, budget and general accounting, drop-out analysis and reporting.

II. Choice of Vendor - Vendor II

III. Justification of Choice

a. Rating Chart

b. I selected vendor II because his over-all system set-up offers the most to the buyer. Even though his quoted price ($4,300.00) is the highest of all three vendors, the services rendered to the buyer are the greatest. First of all, the user gets unlimited use for the month; secondly, all hardware equipment seems to be more up to date to handle the large job of the user and it is also faster and capable of more storage. In business seconds can be valuable. Also, the systems service, and educational supports offer the user more advantages than the other two. With an experienced personnel officer on the job for the first year, break down problems could be corrected immediately thus saving the user money. The educational support offers the user a chance to know how to operate the machine himself. Languages used on the machine are advantageous because they offer a variety to the user; they are all modern and the variety will help when programs are bought or borrowed, because if there was only one language, and the programs you bought weren't in that language, you would have to write it over again. Also, the operating systems are beneficial (disk, tape) because they provide for easy storage and take up less space, which may be devoted to other hardware features.

c. I rejected Vendor I because the price he was asking, plus the monthly upgraded rentals were entirely too much for the outdated material he was offering. For example, his hardware equipment was too outdated to handle the problem at hand. No multiply/divide hardware, 900 and 400 CPM Card reader and punch, etc. The language facilities were also very limited that I felt the user would be losing valuable time and money because many times the machine couldn't possibly handle two jobs at once. Also the support systems were not very promising. The support system - valuable time would be lost while the person who services the machines could actually get there and fix it. The distance for educational support was an outrageous disadvantage. And, lastly, although reference manuals are almost always very sketchy and technical, this one seemed overly technical.

I rejected Vendor III mainly on cost of rental. His system, like vendor II seemed to be very up to date and capable of handling a load of the size required by the user however, due to over-time charges and added rental for upgrading, I rejected him. Also, their support systems, except systems support, were very sketchy and didn't offer enough information. Reference manual was very technical and again price wasn't right.

Sophie T. Good

I. Description of proposed system and objectives.

The computer is initially being purchased to perform the following jobs:

1. Payroll
2. Pupil Census
3. Student Scheduling
4. Mark Reporting
5. Failure Analysis and Reporting
6. Budget and General Accounting
7. Dropout Analysis and Reporting

The school district estimated the above listed jobs would require 12 months to implement. Sixty visual display terminals will be implemented for computer assisted instruction from remote locations upon completion of the installation of computer to be used for above mentioned jobs.

II. According to my rating I chose Vendor C, but on second thought I think I will buy from Vendor B.

III. B. Adequate core memory for present and future use. This computer is faster. The software available meets many needs for which the district wants a computer, this will save many hours and many dollars in programming. Experienced personnel available for years service for systems support. Education support, programmed instruction for management, and data processing personnel. Unlimited time use per month. Reference manuals are easy to understand.

C. I rejected the computer from Vendor A because I felt it was inadequate to handle the present jobs in a reasonable length of time. In an expansion program it would be inadequate. Software was not available; all programs would have to be programmed and, on the whole, it would be a more costly operation in the long run. Computer from Vendor C would have been a likely choice but some things were inadequate.

Maryann Groblewski

I. A computer is being obtained by a school district for payroll, pupil census, student scheduling, mark reporting, failure analysis reporting, budget and general accounting, dropout analysis and reporting. The above jobs will take twelve months to implement. When completed, the school district will use CAI from remote locations, using sixty visual display terminals.

II. Justification of choice.

III. Choice of Vendor is Vendor II

a. (1) Vendor I did not have enough core memory
   (2) Vendor II had fastest speed
   (3) Vendor I did not offer enough arithmetic
   (4) Vendor I no read/write/compute simultaneity

b. Vendor II reads cards faster
c. Vendor II faster in LPM

Vendor I does not offer very much in hardware efficiency.

Vendor II fastest, more feasible than Vendor III.

Languages - Vendor II has more and commonly used languages.

Data Manipulation Routines

Vendor III is better here since it has the library of peripheral conversion routines.

Operating systems

Vendor II - since both tape and disk resident are fairly good. Vendor I completely out.

Program Maintenance and Debugging Aids

Vendor III stands out here although Vendor II is still acceptable.

Applications Software

Very important because of the objectives of the system.
Vendor I completely out
Vendor II has excellent student scheduling packages plus the fact it is programmed in COBOL and Fortran.

Vendor III really has no significant use here.

Systems Support

All three hold weight here.

Service Support

Vendor III ideal, but other two are acceptable.

Education Support

Vendor I limited
Vendor II Excellent
Vendor III also excellent

Software Distribution

All three acceptable

Reference Manuals

Vendor II - since they are well written and easy to understand which I think is extremely important.

Cost/Month

Vendor II seems like the most expensive but it has more to offer and with all the extra expense in Vendor III the school district would most likely end up paying the same for number III.

Charles C. James

I. The L.L. School desires specifications for a computer program to perform various jobs. The initial program will be to do scheduling payroll, pupil census, mark reporting, failure analysis and reporting, budget and general accounting and dropout analysis and reporting. The program will then be expanded to implement computer assisted instruction.

Objectives to be achieved:

1. To develop the payroll for 24 pay periods.
2. To efficiently up-date the school census.
3. To develop the scheduling of pupils for the high school.
4. To develop a mark reporting system.
5. To develop a dropout analysis report.
6. To establish budgeting and general accounting for the total school system.
7. Expand the program to cover educational class room instruction.

II. Choice: My choice of a computer is Vendor Number II.

III. The following reasons are to verify my decision of Vendor Number II Machines.

1. 32,000 characters in memory.
2. Faster card reader and punch.
3. 4 Languages available for expansion.
4. Operation systems adequate.
5. Software applications for payroll is adequate.
6. Educational support in near by locations.
7. Manuals are easy to understand for future years.
8. System may be upgraded with additional rental (monthly).
9. Unlimited cost of using time.

With the expansion of the educational program using the computer the unlimited time clause is a financial saving. This may be used in the daytime for our regular class as well as evening for Advanced Adult Classes.

In selection of this computer there is one weakness. The financial Edit is not included in the hardware but it is available in the software. Therefore this CPU will service the school system at the present time; and it has enough core storage for expansion at a future time.

Vendor Number One was rejected for the following:

1. Not enough core storage.
2. It is a slower operation.
3. Only a basic assembler language therefore some of our personnel did not understand operation.
4. Price is low but additional costs will be necessary for a total operation.

Vendor number three has a slower rate in its memory section. Manuals for operation would be too difficult for the school personnel to understand. The software items could be held up before reaching the engineer from the home office. Limited time to 200 hours and additional cost for overtime.

Marjorie Kepner

EVALUATION OF A COMPUTER

I. The school district will do the following jobs during the first twelve months: payroll, pupil census, student scheduling, mark reporting, failure analysis and reporting, budget and general accounting, and dropout analysis and reporting. When the implementation of these jobs is completed, a program of computer assisted instruction from remote locations using sixty visual display terminals will be started.

II. Vendor #2.

III. Justification of Choice:

a. Choice was reached by a comparative method. The attributes were listed and given a point value relating to the requirements which this system would need. A weight system was applied.

b. The initial cost is larger, but it can be used "unlimited". Since there are seven different jobs to implement the first year, this would take considerable time. The fact that sixty visual display terminals are to be implemented after the first year, the unlimited use is very important. Time can be rented out. Since disk drives must be used with terminals, the experience acquired during the first year would be an asset when the terminals are started during the 2nd year. With this more time can be rented and be quite productive. The CPU can use decimal arithmetic, binary arithmetic. It can multiply and divide - important in payrolls, and math computation. It can read/write/compute simultaneously. It also has communications interface which will be important after the first year since this means it can change the terminal frequency to the CPU frequency. There are 4 I/O channels in comparison to 2 I/O channels on its nearest competitor (#3).

Although there is no software available free, I feel the superior attributes concerning the computer assisted instruction programs starting the second year is most important. To me over a longer period of time this system (CPU) would be cheaper and be much more efficient.

The system includes sufficient hardware for the 7 basic jobs to be done -- card reader, card punch, printer, 4 tape drives. The card reader, card punch and printer were faster than the closest competitor - #3. #3 has more and faster tapes but since disk will be needed for computer assisted instruction with terminals (#3 doesn't have disk in initial cost) this factor outweighs the slower and fewer number of tapes. The program maintenance and debugging aids are average - sufficient. There are good data manipulation routines for I/O control systems; sorts/ collates/merges; macro assemblies; peripheral conversion routines, and file maintenance.

The languages are good - COBOL, Fortran IV, Algol, and basic coding languages.

The applications software is more inclusive than other competitors. Includes student scheduling which the others do not. The COBOL language is used primarily with the inventory ones in Fortran. The Assembler language wouldn't be nearly as efficient.

Systems support for number 2 included trained personnel as well as one man for one full year.

The service support for #3 was good - full trained engineer "on site" with 1 hour response for other help. This is important. #2 does have trained personnel available on call so I felt other factors held more weight.

The education support for #2 was best since it included programs for all data processing personnel at home office, regional education centers, branch offices and customer's offices. #3 did not have as extensive a program and it was given only at regional offices. This would be more expensive.

The reference manuals supplied by #2 are well-written and easy to understand whereas #3 were very technical and therefore not too valuable.

c. The #1 vendor was too far away from specifications to consider.

#3 rejections - Comparisons are mentioned above. To me, although #3's cost is cheaper over a period of a few years, #2 would pay for itself with time rented out. During the first year the training received would be of considerable value in the future years. This would help in the initial expense of number 2.

Joseph Kundla

I. Computer is purchased for:

Payroll
Pupil Census
Student Scheduling
Mark Reporting
Failure Analysis and Reporting
Budget and General Accounting
Dropout Analysis and Reporting

II. Third Vendor

III. a. See analysis sheet
b. Reasons for choice:
Adequate Core Memory now and in future
Memory cycle time and tape or disk may be used
Peripheral
Arithmetic Calculations and Decimal and Binary
Debugging and Program Maintenance: easy to locate errors
Provisions for peripheral conversion
Excellent library
Assembler language
Full-time engineer
Good Educational Support
One-time service charge
c. Rejection Reasons:
#1
Basic Language difficult
Limited peripheral routines
Core Memory limited
Separate peripheral equipment
Card system in Vendor I
Cost is greater in I & II for what is being obtained.

Sister Mary Luke, R.S.M.

The school district is in the market for a computer that has the capacities for performing the following jobs:

Payroll
Pupil Census
Student Scheduling
Mark Reporting
Failure Analysis and Reporting
Budget and General Accounting
Dropout Analysis and Reporting

It has been estimated that these jobs will take 12 months to implement. It has also been decided that on completion of this implementation, the School District will begin to implement computer assisted instruction from remote locations, using 60 visual display terminals.

Vendor II was chosen. This choice was based on the following:

1. There are seven jobs to be done on this computer and the hardware, software and other attributes listed would provide the core storage, speed and means of performing these jobs.
2. This vendor's computer already has the communications abilities.
3. The 4-language capability.
4. I/O overlapping
5. It contains good control programs and good operating system.
6. Contains a sort/collate/merge program and a file maintenance routine.
7. It contains both sequential and random access methods.
8. The vendor expresses himself relative to the cost, when he states "additional cost for first 12 months is offset by having the largest volume of information on tape rather than cards."

Vendors I and III were rejected because:

Vendor I

1. Small core capacity
2. This computer does not offer the user the advantage of a good control program nor of an operating system.
3. Language limitation
4. Lacks I/O simultaneity
5. Limits the buyer immediately by proposing to sell a card system initially

6. In my opinion there are too many limitations in each area

Vendor III

1. Lacks random access devices
2. Additional cost for communications feature
3. Language limitation
4. Operating System requires 15,000 characters of memory, which is half the core
5. Cost appears too high when all factors are taken into consideration.

Robert Marr

I. Description of Proposed System and Objectives

The school district is in the process of converting the following jobs, which are being done manually into jobs which will be done by machinery: Payroll, Pupil Census, Student Scheduling, Mark Reporting, Failure Analysis and Reporting. In doing this conversion, the school district would like to acquire the computer and necessary peripheral equipment which will do these jobs most efficiently. After the initial jobs mentioned above are implemented, which will take approximately twelve months, the school district wishes to implement computer assisted instruction from remote locations using sixty visual display terminals.

II. Choice of Vendor

According to the rating system used the computer selection would be from Vendor II.

III. Justification of Choice

a. Using the rating system of E=4, G=3, F=2, D=1 and N/A=0, Vendor II received a total number of points equal to 40. Vendor III received a total number of points equal to 37. Vendor I received a total number of points equal to 27.

b. The reasons for choosing Vendor II were:

1. The vendor proposes a system which will handle the current jobs more efficiently as the additional jobs are implemented.
2. The disk drives will be capable of handling much more storage space in the event more programs are implemented into the system.
3. The required communications abilities are a standard feature of this computer.
4. The cost per month remains the same for unlimited use.
5. Reference manuals are well written and easy to understand therefore after the trained personnel of the vendor have left, the school's own personnel should be able to cope with most minor difficulties.
6. Disk resident was rated excellent by previous users.
7. Excellent student scheduling packages are available.
8. Very good library of payroll and general accounting available.

c. Reasons for rejection of Vendor I

1. Very limited in many of the areas which are specifically needed i.e. languages, simultaneous operations (read, write, compute)
2. No application software available
3. Reference manuals technical
4. Cost for overtime may be great
5. Not much compatibility in the future
6. Communications capabilities available at extra cost
7. Core memory too small

Reasons for rejection of Vendor III

1. The operating systems were not quite as good as Vendor II
2. The educational support was not as elaborate as Vendor II
3. The reference manuals were very difficult to understand
4. Additional cost for communications capabilities
5. Additional cost for overtime work which sometimes may be great.

Abner Millard

I. Description of proposed system and objectives. A school district is considering purchasing a computer that will be capable of doing the following jobs:

1. Payroll
2. Pupil Census
3. Student Scheduling
4. Mark Reporting
5. Failure Analysis and Reporting
6. Budget and General Accounting
7. Dropout analysis and reporting

The district has estimated the above jobs will take twelve months to implement. Further, when the jobs are completed, they will be used to implement computer assisted instruction from remote locations, using sixty visual display terminals.

II. Justification of Choice

I would give the contract to Vendor III. The CPU is fast and its 32,000 characters of memory are adequate. The CPU is large enough to handle the programs required. The operating system for the control processor is sufficiently large. Peripheral equipment can be attached to it in the form of disks, if necessary. I gather that it would be feasible and proper to attach another manufacturer's peripheral equipment if needed, which is also fine. In other words, this CPU has many capabilities for future expansion and use.

The systems support offered, that of one full-time experienced systems engineer for one year is an excellent feature. This, together with an adequate number of training classes for programmers and operators at the regional educational centers, coupled also with several programmed instruction courses for all data processing personnel provides good education support.

The fact that software distribution is the responsibility of a systems engineer distributed through the name office assures the system of adequate service and constant updating.

Excess time can be rented out to other consumers, and the profits from programs such as these will help pay the cost.

The CPU is also capable of handling cards or any I/O device in sequential order, and is also capable of random access methods, such as disk, drum and core storage.

Mathematical aids, together with the ability to use other languages, makes this offer of Vendor III my choice.

III. Rejected Proposals.

Vendor I. Not considered. No multiply-divide hardware. No binary arithmetic. No program compatibility, even after the initial card system has been upgraded after a year to a more sophisticated system with tape, disk and communication capabilities. It also has no program tracing or trace routines. The software distribution is direct from home office by request, which is undesirable. It would be slow and inadequate. Reference manuals are extremely technical, therefore hard to read, and since they are to be distributed directly to be distributed to the user, they would be practically useless to the average reader. There are no classes for operations personnel and the regional center for other formal education is one hundred miles distant. There are only limited peripheral conversion routines. This does not justify the vast amount of money required.

Vendor II. There is no financial edit feature. There is no cross-reference routine and no flowchart program. Although trained personnel are available on call, the speed of service is not stated. The software is distributed upon request by the user. I feel this is a good system, but for the above reasons I do not rate it on par with Vendor III. The cost per month is $4,300. for unlimited use with an additional monthly rental for system upgrading.

Edward Miscavage

I. The system I am buying this computer for is to do the following type operations:

1. Payroll
2. Pupil Census
3. Student Scheduling
4. Mark Reporting
5. Failure Analysis & Reporting
6. Budget & General Accounting
7. Dropout Analysis & Reporting

II. My choice is Vendor III.

III. My choice of Vendor III was made after careful investigation of the proposed proposals, and in my opinion as to which items are of prime importance such as payroll or monies in general, which must be as accurate as possible because the public is involved with this and reports and audits must be presented.

Cost was a small factor although it is the cheaper machine.

The excellent report I received from other people that have used this vendor I have chosen.

(a) (Rating Table.)

(b) Upon reading both proposals, they seem very close in my estimation. With my limited knowledge at hand, I chose to use A & B. A=2. B=1. Being that they were so close. The fact that Vendor III had more to offer in ways of handling of money. This also was a factor.

(c) My choice would not be Vendor I since:

CPU memory too small
No multiply/divide
Limited peripheral routines
System Support in advisory capacity only
No educational support to speak of
Cost of the system cannot be downgraded
    during contract
Initial cost was not a factor in this case
I checked with people who have had this system
    and they do not have very much to say for it.

Pete Mischak

I. Description of Proposed System and Objectives.

We are in the market to buy a computer because the means of doing the job we have at hand are too slow and time consuming. The computing system we plan to employ will do the payroll, the pupil census, the student scheduling, the mark reporting, the failure analysis, reporting the budget and general accounting, and the dropout analysis and reporting. In addition, the school district plans to incorporate computer assisted instruction later on which will require additional storage which is one reason Vendor II with his disk drives is being chosen over Vendors I and III.

II. After comparing all the vendors by the total points method, Vendor II has won out over Vendor I and Vendor III.

III. (a) Vendor II was chosen because he was the vendor who garnered the most points according to our individual consideration. He was the vendor who ranked highest in 2 of our categories that had the most points or weight assigned, Vendor III ranked highest in one and Vendor II and Vendor III tied in one of the attributes.

Vendor II won out in Hardware and Applications software.
Vendor III won out in Service support.
Vendor II and III tied in Systems Support.

(b) In hardware, Vendor I had no read/write/compute simultaneity which wasted the computers time and also had the longest memory cycle. Vendor II's memory cycle time was the shortest. In addition, Vendor I had no multiply/divide hardware. Vendor II had disk drives which was better for access and had more storage space for CAI programs to be implemented later. In addition, Vendor II had the best card reader and printer available of all the vendors. Vendor I used only cards which is not the best system for our applications. Vendor II had 4 languages available, while Vendor I had only basic assembler language and Vendor III had 3 languages. The more languages the better the computer because more programs are available to it. Vendors II and III had good Data Manipulation routines which Vendor I did not. Vendor II's disk required less memory than did Vendor III's when Vendor III would implement it later on in the system. At the present time Vendor III is using only tape and cards. Vendor I has no applications software which is important in our system since we have so many jobs to be done which means we would have to program all our own programs for the census, report cards, payroll, etc. Vendor II was best here because he had programs for payroll, general accounting, accounts receivable and payable, student scheduling packages with the programs being written in COBOL, and some inventory programs in Fortran. Vendor III had payroll and general accounting packages but no scheduling programs and his was written primarily in assembler language. Vendor III had the best service support because he had a man on "site" but Vendor II was okay because he had a man, as did Vendor I, on call. (available on call). Vendor II had the best Educational Support because he had training at the customer's office which is tremendous; Vendor III had training at the regional office, but there is no telling how far the regional office is from the customer. Vendor I had his office (educational) 100 miles away which was a bad feature also. Vendor I and Vendor III had good technical manuals but they were written in a technical way hard for a lay person to understand. Vendor II on the other hand, had a well-written manual and easy to understand, which is an important factor as far as I'm concerned. What good is a book if you can't understand it, you would have to call in a specialist for every little thing in that case.

(c) Vendor I was rejected because his system was one of cards only, and with no read/write/compute simultaneity the computer is idle too much. And later, when a switch was made to tape or disk, since there is no program compatability, it would lead to problems later on. In addition, no software applications and long distance to training centers is bad for our system. In addition, a technical manual hard to understand is of little use to us. As a result, Vendor I was not chosen. Vendor III had a fairly good system but scored below Vendor II in some important areas. At the beginning he used only tape and when he would convert or add on his disk, his disk required 2,000 more character memory than did Vendor II. He had no scheduling programs which I think are important since scheduling is important in a modern large capacity school system. In addition, his education was to be of our personnel at his regional office, maybe it would be far away and that would not be good. Also his technical manual was difficult to understand, again little use to us if that is so.

Summing up, Vendor II which is somewhat more expensive is a better package deal as far as our system with its goals and objectives is concerned.

Joseph A. Peel

I. Wilkes Barre City School System desires to purchase a computer and peripheral devices to build an EDP System which will currently serve the district in preparing the functions of, and reports for, the following systems:

1. Payroll
2. Pupil Census
3. Student Scheduling
4. Mark Reporting
5. Failure Analysis and Reporting
6. Budget and General Accounting
7. Dropout Analysis and Reporting

Upon the completion of this phase of operations, the district will begin to implement computer assisted instruction from remote locations. Sixty (60) visual display terminals are planned.

It is estimated that the initial phase will take twelve (12) months to implement.

II. I would recommend Vendor II.

III. Justification

(a) (Rating Table)

(b) Specific reasons for choice.

1. I feel with a more sophisticated hardware configuration, it would be possible to implement the total system more rapidly the first year. The additional expenditure or purchase often is easier to have approved than to make a smaller initial purchase and then be required to make substantially large expenditure for additions to the initial purchase the following year.

2. Having the disks available toward the end of the year would permit the operators to secure experience in this type of operation. Members of the professional staff could also be oriented prior to installation of a real CAI program. The staff could get their "feet wet" prior to student involvement.

3. The wider range of language capability would permit future expansion of the system.

4. The educational programs available and willingness to present programs, on different command levels offers greater opportunity.

5. The number of channels available and large storage capacity will permit more rapid transfer to CAI.

c. Reasons for rejection

Vendor I

The configuration of hardware is totally inadequate and would require too major a changeover at the end of the first year.

The routines, software and educational programs are very poor.

Vendor III

The inadequate educational program was one of chief deficiencies.

Technically written manuals limit their use.

Language selection not comparable to system of Vendor II.

Margaret Ann Price

I. The proposed system will be used for the following jobs in a School District.

   1. Payroll
   2. Pupil Census
   3. Student Scheduling
   4. Mark Reporting
   5. Failure Analysis and Reporting
   6. Budget and General Accounting
   7. Dropout Analysis and Reporting

   The objective is that it will take 12 months to implement and upon completion they will begin to implement computer assisted instruction from remote locations using 60 visual display terminals.

II. Vendor II

III. Justification of choice

   a. I used a point system, Exc = 4, Good = 3, Fair = 2, Poor = 1, N/A = 0 a weight of 2. I listed the vendors and the attributes. I assigned a value to each attribute, these being E, G, F, P, or N/A. At the end I took the total E, G, F, P or N/A and multiplied it by the number assigned to its value and this multiplied by the weight which was two.

   b. Hardware nanosecond faster than micro-second; additional languages that can be used. Reference manuals are well written and easy to understand. Trained personnel available on call so they would be within the area. Sorting is faster on disk than on tape and this has disk and gives experience on tape and disk. There is more educational support available.

   c. Vendor I. Not enough core memory. The education support being given is too far away. Software distribution is direct from home office, the home office may be thousands of miles away and take weeks. Reference manuals are technical. There is no read/write/compute simultaneity. No multiply/divide hardware, yet you would need this in doing a payroll. The one advantage would be the low initial rental.

Vendor III. Micro-second memory cycle is not as fast as nanosecond. The reference manuals are difficult to understand.

Zack Riehl

I. Descripton of Proposed System and Objectives:

The computer is being purchased to do the following jobs: payroll, pupil census, scheduling, mark reporting, failure and analysis reporting, budget and general accounting, dropout analysis and reporting.

II. Choice of Vendor: Number two (2).

III. Justification of Choice:

A. I arrived at my choice from the rating scale attached.

B. The hardware available would be very efficient for our use. I especially like the disk drives. His (the vendor's) language is very much up to date and could be used for any type of problems. It could handle much information by using the tape units and disk units. It would be very fast obtaining information. By referring to my rating scale, the specific reasons can be obtained. The cost does seem high but you do get more from his hardware. It seems everything he uses is up- to-date and more advanced for future use than the other vendors. It is quick, reasonable, up-to-date for use in all areas.

C. The reason for #I's rejection is that it is a card system which takes more time and space. It will be upgraded in a year - but if you are getting a system you will not want to change in another year. Do it right the first time and save time and money and headaches. The cost is low, but does not offer as much. It is simply inefficient for our needs.

The reason for rejecting #III was mainly the cost. You are told a specific amount of hours to use your system and additional charges are made after this. Additional charges will add up. I did not like the reference manuals being technically written and hard to understand. This vendor is lacking mainly in reference manuals and cost. It was a close second, but too technical.

Nancy Rovinski

I. Description of proposed system and objectives.

The School District has estimated that it will take twelve (12) months for completion of the following jobs:

1. Payroll
2. Pupil Census
3. Student Scheduling
4. Mark Reporting
5. Failure Analysis and Reporting
6. Budget and General Accounting
7. Dropout Analysis and Reporting

II. Vendor II or "b"

III. a) (Rating Table)

b) Specific reasons to justify choice:

There really isn't too much significance in the final choice of B and C; however --

Not only is B faster than C, since C really is fast enough, but it has a communications interface which will be more suitable after the initial period of one year -- when they intend to implement the CAI education from 60 remote terminals. C makes this an additional charge of $100 per month. It allows a greater use of tape, and also provides for additional disk experience for programmers. If C waits for the year before training - the programmers will have lost the necessary ease and efficiency that those on B already have.

B offers more languages which may prove to be of future benefit, when they intend to use CAI programs. It also offers more in the way of specific packages (software) that are necessary for the specifications as outlined.

c) Rejected and reasons: I rejected Vendor I because of its inadequate hardware, its basic language only and because of its inadequacies in general - limited peripheral conversion routines, no operating system or software programs; not even satisfactory educational support unless they travel at least 100 miles.

Alice Schappert

The Wilkes Barre City School District is planning to install an EDP center which will be able to handle payroll, pupil census, student scheduling, mark reporting, failure analysis and reporting, budget and general accounting and dropout analysis and reporting. Ultimately the district will include CAI using 60 visual display terminals. This will involve the purchase of the CPU, a minimum of four tape drives, a card reader punch, a printer and sixty terminals. In terms of software, there will be required an assembler, a COBOL compiler, a sort/merge program and possible certain utility programs which might be available. I shall attempt to rate the three vendors according to the point system. (See next page - Rating table).

I chose Vendor number II for the following reasons:

1. Rated according to a point system with a possible 700 points Number 1 has 370, Number III had 574 and number II came out on top with 690.

2. Number II had the fastest memory cycle.

3. The disk system in Number III used 2000K additional memory storage.

4. Number I, which is a card system, seems totally inadequate. The lower price would be false economy because the sytem would not do the job.

5. According to what may be "faulty calculation" it seems to me that Number III actually will cost more in the end. At the end of a year, there will be $1,000 per month additional charge for the two additional disks which brings the total to $4,200 plus overtime charges which Number II does not have. There was also mentioned in Number III an additional $100 per month for communications.

6. Number II seems to be the only one which offers interface, which I somehow remember as necessary to a CAI system.

7. Number II has the COBOL compiler and my system wants to use COBOL.

8. Number II seems to have the best Reference Manual.

Edward Solack

The School District is contemplating purchasing a computer for the following output: Payroll, Pupil Census, Student Scheduling, Mark Reporting, Failure Analysis and Reporting, Budget and General Accounting, Dropout Analysis, and Reporting. It is estimated these jobs will take twelve months to implement. Upon completion, they will begin to implement computer assisted instruction from remote locations, using sixty visual display terminals. It is my intention to select a vendor and justify my selection.

My Choice of Vendor is Vendor III

Initially, I feel that disk drives are not needed and can be added in the future thus permitting a lower rental which I feel is justified at this time. There is sufficient core storage for future expansion. The hardware is more than adequate to do the job for a year or two; then if need be, additional random access devices can be added. Otherwise, we may be paying for extras we don't really need.

COBOL and Fortran are the most commonly used languages for educational purposes, if Algol is necessary, I think it could be purchased at the opportune time.

It provides simultaneous operation for I/O control system, has MACRO assemblers and a File Maintenance for updating files. The library of conversion routines is extremely important to me since it could save a lot of work and headaches later on.

The program Maintenance and Debugging Aids also would carry a lot of weight with me. Very often it would be necessary to locate a piece of information or go through a part of the program you're having trouble with.

From my own experience with machines, I would like a fully trained engineer "on site".

Vendor I rated poorly in most categories. Insufficient core storage. Generally, the hardware is adequate. No high level languages - Support programs inadequate. The low initial cost might be quite expensive in the long run.

Vendor II compares quite favorably with Vendor I and in some cases is superior. However, the higher cost at this time does not seem justifiable.

Fred Templin

I would have Vendor No. II as my first choice, Vendor No. III as second and Vendor No. I as third.

In the above table I have tried to evaluate the computers as to their abilities of doing the present jobs and the possibility of their doing future and more difficult tasks. The total evaluating points indicate that I should select No. II. I feel that this would be the best choice even though it will cost more for the first year. I believe that present jobs can be run on a schedule that would not exceed the 200 hours allotted for No. III but by the time the sixty terminals are set up and the two disk drives are added the monthly rental and overtime costs would far exceed the cost of number II.

The reason I feel that No. I should be rejected is that it is limited. Although it is capable of doing the present jobs, as more jobs are added, the machine will be too slow to stay within the limits of the 200 machine hours. Also, it will take more man hours to set up and run programs. Thus, in the overall picture No. I may cost more than either of the other two.

Clement Valletta

I. The objective is to purchase a computer system to accomplish in the School District over twelve months after installation, the following fuctions: payroll, pupil census, student scheduling, mark reporting, failure analysis and reporting, budget and general accounting, dropout analysis and reporting. Upon completion of these implementations the vendor will develop computer assisted instruction from remote locations, using sixty visual display stations.

II. After rather deliberate analysis of initial and projected needs it was determined that Vendor B is the best.

III. The following table evaluates each item on a base maximum of 4: it then weighs the four areas according to the indicated amounts; finally it establishes the total values.

(Chart)

It was found that Vendor B although of an initial cost higher than either A or C offers the savings of card punch operators and the great savings of disk drives in relation to expectations of extensive computer use in future years when CAI, in addition to the usual operations, will be adopted. Vendor B also offers more flexibility in terms of speed and is equal with Vendor C in amount of storage and far superior to Vendor A.

Since languages used upon the computer should be as varied as possible in the near future, it was deemed advisable to choose Vendor B which offers the widest selection. Presumably language adoptation can be accomplished most readily upon B. Furthermore, B offers a slightly superior range of peripheral devices and software uses than does C and is far superior to A.

Both B and C offer the same support strength and both are superior to A.

Since it is expected that the computer equipment system will be used extensively and certainly more than 200 hours/month and since communications will be a necessary feature with CAI, it was found that Vendor B is most preferred. Vendors A and C charge overtime beyond 200 hours. (A-$10.50/hr; C-$20/hr.); Vendor A does not mention communication, nor does he define disk fees. Vendor C stipulates a communications charge of $100.00 additional monthly and a $500.00 additional charge for disk storage.

In sum, we find that Vendor B is most preferred.

Nell Vernarski

I. Description of the Proposed System.

Because of the increased enrollment, increase in the required number of courses and inadequate salaries, there is a constant shortage of good teachers. To help correct this situation, it is felt that the installation of a computer would remove most of the clerical duties from the teacher, thus giving him an opportunity to do more classroom teaching. Likewise, it would be of benefit to the office personnel by doing such reports as payroll, budget and general accounting. The Computer also could be used for classroom instruction purposes.

II. Objectives

To produce the following reports: Payroll, pupil census, student scheduling, Grade reporting, Failure Analysis and Reporting, Budget and General Accounting, drop out analysis and reporting. In addition, CAI is to be implemented within 12 months.

III. Choice of Vendor - Vendor II.

IV. Justification

(a) Rating Chart

(b) Reasons for justifying my choice:
I have chosen Vendor II because I felt that the jobs for which the computer is being initially purchased would be handled more efficiently on the computer. Because of the size of storage additional jobs could be handled much easier. The disk drives could be used very efficiently for keeping permanent records of all students. Random access would be of great benefit later when the school is asked for a reference on a former graduate or even former student. The fact that the required communications facilities are a standard feature of this computer makes it more desirable since there is an installation charge for this special feature in other computers. In addition, oftentimes these communications features may not fit our particular machine and may cause the computer to work less efficiently. More data can be stored on this computer. Speed is greater. The availability of extensive software is an asset in this computer. In the operating systems, the tape resident is adequate and the disk resident excellent. As for Program Maintenance & Debugging the program maintenance, or library programs seem adequate. Applications Software - although this system supplies a very good

library, nevertheless, these programs oftentimes do not conform to our needs because they must be general enough to satisfy all jobs. The systems support and service support is as good as the other vendors offer. The education support seems better since formal classes are held for management, programmers and operations personnel, and there are several programmed instruction courses for all Data Processing personnel. The reference manuals are well written and easy to understand. The cost per month may be greater but this is for unlimited use whereas the others are for limited use. Furthermore, the required communications abilities are standard while the others need to have these features installed with an additional cost.

Computer Evaluation Technique Used.

A minimum of 2 to 10 points were given for each of them. Comparisons were made as to what features each computer had.

(c) Proposals Rejected.

Computer No. 1 was rejected because a card system seems inadequate for this job. It seems like a waste of money to install a card system first and then to upgrade to a more sophisticated system later. The Sorter, Collator, Interpreter, and Reproducer really wouldn't be needed in an upgraded system.

I rejected Computer No. 3 because it did not have the communications features that are reuqired with installation of these features there is a monthly charge of $100. Although the cost of this system is slightly less, this machine has limited use (200 hrs.) and the overtime charge plus 2 additional disk drives would probably cost just as much in the end.

APPENDIX F

EDITS

GUIDELINES TO SELECTION, DESIGN, IMPLEMENTATION AND FINALIZATION OF THE INDIVIDUAL PROBLEM

The purpose of the Individual Class Problem is to apply data processing knowledge, on an individual basis, to a practical problem within education, preferably within your own discipline. The three phases of the problem are as follows:

PHASE I PROBLEM SELECTION

The actual selection of a problem within the participants discipline is to be made by the individual. Selection of the problem should be based upon an area which can be solved by, or aided through, the application of data processing. It is important to judge the value of the system to education before final selection is made.

Each class participant will be required to submit a written problem proposal on or before Thursday, November 13, 1969. The purpose of this proposal is to evolve a logical formulation of a plan to be pursued for the remainder of the course.

The instructor will evaluate each proposal to determine if data processing offers a feasible solution. Otherwise, the instructor may guide the participant toward an alternate approach to his problem or suggest selection of another problem.

PHASE II PROBLEM SOLUTION FORMAT

Upon proposal approval the participant will develop the following sections:

A. Title Page - showing the working title of the proposal along with the identifying information of the participant.

B. Problem Statement - a brief, but adequate statement of the problem.

C. Methodology - a description or outline of the manner in which research is to be conducted. This section should include references to any flowcharts, programs, and other general documentation procedures.

D. Objectives - brief description of expected end result.

This must be submitted by Tuesday, November 25, 1969. The instructor's review and approval will precede further development.

PHASE III IMPLEMENTATION AND DOCUMENTATION

A. The participant, using predetermined methods, will finalize the design of each element of the problem. Documentation to be developed in this section depends upon the problem and may include:

1. Flowcharts
2. Input/output layouts
3. Record design
4. Program listings (optional)

Close contact should be maintained with the instructors throughout this phase to prevent wasted effort. The instructor may guide and assist, but emphasis must be reflected in individual effort.

B. The end result of the participants' project should be presented in narrative form. All documentation previously developed should be included. The following elements must be incorporated:

1. The participant's evaluation of the project, in terms of the success in meeting the original objectives.

2. Recommendations for further developments.
3. Bibliography, indicating other projects in the same area (if applicable).
4. Contribution to the field of education.
5. Conclusions, reflecting the end result of the participant's effort.

Individual Problem Implementation and Documentation

A. General

Upon approval of your proposal, you may begin the actual design and implementation of your problem solution. Initial class session designated to the Individual Class Problem Implementation begins on Monday, November 24, 1969. Final class session is scheduled as December 29, 1969. Try to be present at all class essions during the course of your Individual Problem. The instructors will be present for guidance through all the phases of your project. Do not hesitate to consult with them. In all cases however, the individual effort must come from you.

The Individual Problem Solution must be submitted and approved in order to satisfy the credit requirements of this EDITS Data Processing Course.

The Individual Problem Solution is to be in the form described in sections C and D below. Approval will be based on quality rather than quantity.

B. Due Date

Your individual problem solution must be submitted for approval, according to the requirements listed below, by December 29, 1969.

C. Content

Each Individual Problem Document should contain the following sections:

1. Title Page. This must contain:
    a. Title of the Project
    b. Author
    c. Course: Educators Information Technology System
    d. Date

2. Table of contents. The Table of Contents should refer to all major sections of the document and any appendices that may be involved. If a major section is broken down into elements, these too should be listed in the table of contents. For example:

TABLE OF CONTENTS

SECTION	TITLE	PAGE
II	Methodology	2
	1. Statement of Problem	2
	2. Purpose of the Study	2
	3. System Description	3

3. Project Abstract. A brief but adequate abstract of the problem will be required here. This abstract should describe broadly:

   a. The nature of the problem - "what" the problem is
   b. The existence of the problem - "why" it is a problem
   c. The solution of the porblem - broadly, "How" is it to be solved through the application of data processing.

4. Methodology. This section will comprise the major portion of the document. Whereas the problem statement described your problem and its solution broadly, this section will contain detail on your system.

   The following outline is suggested for breakdown in this section. Due to the fact that must diversification exists between various problem selections, it must be emphasized that all sections of the outline suggested below may not be applicable in all instances, in fact, more suitable headings may be required for your project; however, the majority of the sections given below will apply to most selections.

   a. Statement of the problem. Even though this statement was made in the previous section, it should be repeated, in detail, here. Your description here should adequately describe "what" the problem is.

b. Purpose of the Study. This section should adequately describe "why" this study could assist you in your discipline or alleviate a problem area within your discipline.

c. System Description. This section should comprise the major portion of the Methodology Section. The section can be further broken down into these elements:

(1) Statistics on Physical System Requirements

Physical statistics on elements of the system should be given here. For example, if the system is one for a district grade reporting system, given here would be such items as: the number of students and the number of schools in the district, etc.

(2) Description of General Systems Flow

A detailed description of your entire system is to be given here. Each process listed on your system flow chart should be described here. During the course of the description, reference may be made to your systems flow chart which is to be included in the Appendix.

(3) System Processing Interval

This section should describe how often complete processing of the system is done. For example, if the system is a district grade reporting system, given here may be the information: "processing is performed at quarterly intervals during the 10 month period of September through June."

(4) File Organization

This section should give details on all files used in the system, but especially on the Master File. Details given should include:

- (a) Organization; i.e. sequential, index-sequential, random.
- (b) Blocking Considerations; i.e., Blocked or unblocked; blocking factors used.
- (c) Sequence; i.e. sorted on which key items and in what order.
- (d) Field definition sizes and codes, if any. Reference should be made here to specific record layouts contained in the Appendix.

(5) File Creation

Description of creation of master file should be made here. Details such as "from where" or "from whom" source documents would be obtained, should be given. Reference should be made to system flow chart of creation of master file.

(6) File Maintenance

Detailed description of maintenance of Master File should be made here. The description should answer such questions as: how often will master file maintenance be done; how will it be done? what additions, deletions, changes make up maintenance? Reference may be made here to file maintenance system flow chart and/or record layouts of additions, changes or deletion cards.

(7) Hardware Requirements

Basic hardware configuration should be listed here.

(8) Exception Handling

Describe in detail exceptions tested. Describe procedure to be used to handle these exceptions. Reference may be made to your system flow chart given in Appendix.

(9) Controls Required

Describe in detail program controls that are required in your system. Reference may be made to controls shown in printer or record layouts.

(10) Program Narratives (if applicable)

For each program required by your system, give a narrative detailing:

a. Inputs to the program, their source and sequence.
b. Outputs of the program, their sequence and disposition.
c. General description of what program does.

5. Objectives

The fifth section, Objectives, can be divided into these elements:

a. Objectives. Here give your evaluation of the project, in terms of success in meeting the original objectives.

b. Recommendations. Give your recommendations for further development of the project.

c. Contribution to Education. State the contributions to the field of education produced by the project.

d. Conclusions. State your conclusions, reflecting the end result of the effort.

6. Appendix. The appendix, or appendices, should include:

   a. System flow chart
   b. Program flow chart(s) - if applicable
   c. Creation of master file system flow chart - if applicable.
   d. All card, tape or disk record layouts used by system
   e. Printer layouts of all reports produced by system.
   f. Program listing - if applicable.

7. Bibliography. Any books or articles researched in conjunction with your project should be listed here.

D. Format of Individual Problem Document.

1. Form

This document must be typewritten on standard 8½ x 11 paper. It must be contained in a standard plastic or hard cover binder.

2. Title

Major Title: Title of your specific project.
Subtitles: Submitted by:
Course:
Date:

3. Content

Seven sections (together with subdivisions) as named in Section C above, these being:

.. Title Page
.. Table of Contents
.. Abstract
.. Methodology
.. Objectives
.. Appendix
.. Bibliography

4. Size

Size will be determined by each participant. Emphasis will be on quality.

5. Approval of Project

Final approval will be given by members of the staff of InTech.

APPENDIX G

Individual Problem - Proposals

Title: Purchases, Disbursements, and Budget Analysis
Author: Joseph Beltrami
Discipline: Business Education

PROBLEM STATEMENT

Conversion of Accounts Payable and Disbursements manual system to a data processing system requires the creation of a totally new system; including designing new forms for purchase orders, checks, and monthly reports, as well as making changes in existing personnel to handle the system and adding new members to the staff where existing personnel are not able to handle areas requiring a working knowledge of data processing procedures and data processing machines. While choice of a computer and determination of alternate uses of the computer are paramount considerations to be made by any school district, this problem will restrict itself to the system required to handle, on data processing equipment, all areas which relate to the payment of funds and appropriations of funds.

METHODOLOGY

While the systems involving control over the handling of cash payments and the proper processing of accounts payable are vital for the functioning of cash disbursements/accounts payable system, one of the prime considerations when data is handled via data processing equipment is the generation of reports which can be utilized by administrators, directors, and all personnel concerned with making policy decisions that affect the entire district, and more so, the entire taxpaying public. With this view in mind, the step in seeking a solution to the problem lends itself to making the desired output the first step.

Once agreement has been reached concerning the desired output, the general flow of data and the processing of that data should receive detailed consideration; the source of input data and the type of input data must follow a logical sequence so that the processing and output will be most efficiently utilized, with some consideration given to reading time of input, processing time, and outputting time.

Another area which should receive attention is the formation of the master data processing records and the formation of the transaction data processing records. Master records on tape must be carefully layed out to provide for maximum data retrieval per time period and maximum data output via tape per time period.

OBJECTIVES

To achieve a system whereby ordering, paying and summarizing disbursements in relation to budget appropriations will be as efficient as possible, omitting detailed manual labor operations such as totaling, compiling, and calculating discounts and amounts owed to vendors.

To achieve a system whereby monies spent on data processing equipment and data processing procedures are justified, in terms such as more and better outputted reports, more information available in less time than that required by a manual operation, and possibly less personnel per work duty requirement.

Title: Analysis of Essa Reading Test and Attendance Results.
Author: Maryann Berger
Discipline: Guidance

PROBLEM STATEMENT

This Program will attempt to develop a permanent remedial-reading student-file and from this to output various reports as stated below.

METHODOLOGY

The purpose of this Program will be to produce the following output from the following input:

1. Mark-sense cards of tests results to be put on either tape or disc.
2. Permanent-file of students in the Program to be developed.
3. Output from this tape reports required.
4. Release counselors from clerical tasks.

OBJECTIVES

As a result of this Program, the following will come about:

1. Student-file.
2. Federal Attendance and membership reports.
3. Sectional results to teachers.
4. Rank reports on standard scores to administrators.
5. Statistical reports.

Title: A System for a Follow-up Study for Graduates of Business Education
Author: Imelda A. Brislin
Discipline: Business Education

PROBLEM STATEMENT

A follow-up study of the graduates of the business education department of College Misericordia for the last five years will be done.

METHODOLOGY

Names and addresses of the graduates can be secured from the alumnae office.

A questionnaire will be mailed to each girl. Questions can be given a code such as:

1. What kind of work are you engaged in?
   0 - Teaching
   1 - Business
   2 - Other
2. Have you been awarded an advanced degree?
   0 - No
   1 - Yes
3. Was your undergraduate preparation adequate for advanced work?
   0 - No
   1 - Yes
4. If you are currently teaching, what subjects do you teach?
   0 - Shorthand
   1 - Notehand
   2 - Typing
   3 - Bookkeeping
   4 - General Business
   5 - Business Math
   6 - Data Processing
   7 - Other
5. Do you feel that you are well prepared to teach business subjects?
   0 - No
   1 - Yes
6. What do you think was of special benefit in your degree preparation at College Misericordia?
   0 - course content
   1 - method of instruction
   2 - faculty
   3 - counseling

The foregoing information is necessary for a state evaluation and for general department interest.

A card would be punched for each graduate from information secured from the alumnae office. This would contain the name, address and year of graduation. This would be the master file and would be put on tape.

When the questionnaire is received, the information would be put on punch cards and processed to produce a new tape.

OBJECTIVES

A printed list of graduates by year, alphabetically, with occupational information will be obtained.

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Title: Accounts Payable
Author: John J. Cardone
Discipline: Business Education

PROBLEM STATEMENT

Management by its very make-up needs an over all picture of the status of its enterprise. Too often while preparing the Accounts Payable by manual means there are too many chances of human error even if it is on the dual or triple postings of the affected accounts. Errors of exclusion or even the transposition of totals may be costly to the organization.

A system of sequence of critical needs and areas of the Accounts Payable as they become due should be considered. The Vendors offer these discounts to induce quick and prompt payment and when an organization is large enough this may become a considerable amount of savings.

Another important area of consideration must include the mathematical extension of the purchases themselves for here it is necessary to check the accuracy of the totals of material requested from the vendor and being certain the extensions are equal to an accurate total of the unit price.

Finally, there must be some method of summarizing the individual amounts payable to the Vendors as well as the total amounts payable to the Vendors as well as the total amounts payable to all Accounts Payable.

METHODOLOGY

A simple but inclusive method is needed to gather the pertinent information concerning the Accounts Payable.

The original source documents need only be the purchases requests from the people in charge of such material. After the original orders are sent to the Vendor (either on his own order forms or by means of letter) we are to await confirmation of the receipt and shipment vouchers. This voucher is then the document from which we begin to record the purchase on our own Card-Punch Machine.

This card punching routine should include the name of the Vendor, Account Payable number, address, any discount information, as well as the number of items being ordered, the unit cost per item and total amount due.

At a preset time the cards are assembled in a batch process method to be processed automatically. In the CPU the entire methods of calculations are to be completed according to a program set up to produce the desired results.

A type of control method can be accomplished here by the use of an adding machine tape to check the accuracy of the information being processed by the computer. The punched cards are then to be considered the Purchases Ledger. This is then recorded on tape to be the latest Vendor Master File.

Using this method it is now possible to have this information on both the punched cards as well as a single unified tape with all the current information. This tape will include for each Vendor any pertinent information as to addresses of each individual Vendor as well as the balance due and the critical period to pay them to receive any discounts. Any other purchases during a specified time will then be processed in a like manner and will be constantly updated.

The above method can be derived from the sorted cards which are to be merged with the Master File showing previous purchases to get an updated Master File.

From this information it is now possible to have another check on Purchases totals by keeping an Accounts Payable Register aside from the Card File itself. This should be updated periodically to keep the control constant.

Title: Payroll Reporting
Author: Maurice Cardone
Discipline: Business Education

PROBLEM STATEMENT

Present day text books do not cover the completion of government reports for payrolls. When the reports are described in texts they usually are completed manually. The time involved and the chance for human error in preparation of these reports can be very costly. The data required on payroll registers has increased greatly during the past decade. The government is constantly asking for more payroll information for their records. For this reason I feel that these reports can be prepared along with an updated payroll register, and printed payroll by computer.

METHODOLOGY

To acquire all the needed information for the reports, source documents will have to be complete and concise. A master tape will be prepared from several source documents:

1. W-4 Employees Withholding Exemption Certificate. This would contain employees social security number, name, address, and the number of exemptions for withholding tax purposes.

2. Employees Individual Payroll Sheet. Contains weekly gross pay, withholding tax, F.I.C.A. Taxes, any other deductions and net pay. This sheet would be updated weekly.

3. Time card. Shows the hours worked and the hourly rate of pay. (This would constitute the current transaction file).

A systems flow will be developed showing the formulation of five reports:

1. A weekly printed payroll (checks)
2. An updated payroll register
3. A quarterly F.I.C.A. and withholding tax report
4. A quarterly state unemployment compensation report
5. A quarterly state or city wage tax report

After the source documents are created (punched cards) they are put on a master tape. Time cards (current transaction file) are computed to find each employees weekly salary. The master file and current transaction file are merged to produce the printed payroll and an updated payroll register. The three aforementioned government reports are printed out quarterly by use of the updated payroll register. (This information could be on tape for each quarter and used to compute the yearly figures for each if so desired. At the present time only the F.I.C.A. and withholding tax report is totaled at the end of the year).

OBJECTIVES

1. The student has a better insight into the nature of tax reports required by the government. He would be familiar with data-processing as it is applied to payrolls.
2. Handling of payroll records would be more accurate and reports would be timely-available when they were needed.
3. This system of processing reports could be expanded to produce any new reports that the government might desire in the future. The production of such reports would not be time consuming and as costly if they were to be produced manually.

Title: Reading Scores
Author: Helen Christian
Discipline: English

PROBLEM STATEMENT

Since I will be testing reading levels of students entering junior high school, I would like to devise a plan for keeping these records and updating them twice a year during their 11th and 12th grades. At present, reading tests are given, but only at the discretion of the individual grade teacher. There is no continuity, and record keeping is rather haphazard. The only systematized records are kept by the remedial reading department, which covers relatively few students.

METHODOLOGY

Student tests results will be punched on cards including student number, student grade, and I.Q. This will be transferred to a tape file to be updated as various retests are given. There will be a program for the tape file as well as an update program and print-out report. Flowcharts will have to be developed as the need arises.

OBJECTIVES

1. To note individual progress
2. To note problem areas for individual attention
3. To check a teacher's efficiency or proficiency
4. To check reading level against I.Q. record
5. To check your school mean level against national levels of the same grade.

Title: Development of a CAI Program for Teaching the Use of Venn Diagrams in Solving Problems in Set Theory
Author: George Daru
Discipline: Chemistry, Mathematics, Guidance

PROBLEM STATEMENT

I have found that in working with Venn Diagrams in Set problems, students have difficulty in grasping the various uses of these diagrams in solving actual problems. This program will introduce students to the basic vocabulary of set theory and aid them in solving problems through the use of documented examples, allowing them to proceed at their individual rate.

METHODOLOGY

I will research the literature to check on the developments of CAI programs in the realm of elementary set theory and of recent educational techniques developed to teach the use of Venn diagrams in a conventional manner. I will attempt to incorporate the new techniques in developing a CAI program which will let the individual student progress at his own rate in working these problems.

OBJECTIVES

In teaching students how to work with Venn diagrams, I find that they are usually confused in working problems in this field since my classes are not homogenously grouped and I am expected to cover a given amount of material. I do not have time to devote to each student on an individual basis. By developing a CAI program in this area, the teacher will be able to check on the progress of each student while allowing each student to progress at his own rate.

As a guidance counselor, as well as a teacher of mathematics, CAI interests and excites me in its tremendous potential to aid the teacher so that the student may obtain more individualized instruction and attention. I realize that I may not be able to develop a program which can presently be utilized in this area, but I hope that through my research in CAI, I will become familiar with its operation and uses and as a result of this knowledge, and be able to implement its adaptation in future school districts in which I may be employed.

Title: Grade Report Cards
Author: Mary Ann Drobnicki
Discipline: English, Social Studies

PROBLEM STATEMENT

To prepare grade report cards for Crestwood High School. This program will be accurate and updated. Marking system will be by letters: A, B, C, D and E. 900 students will receive report cards 4 times during the 1969-1970 school year.

METHODOLOGY

I am going to draw up an outline to explain how to prepare this system. This will also include:

1. A system flow chart
2. Input information
3. Output specification

Teachers will supply an alphabetic list of all students from 7th to 12th grades, with marks for each subject. Teachers will mark sense cards, requiring necessary information grades of the students, but it will be much less time consuming than the present method.

Title: Cobol Program to Evaluate Tests and Assign Grades
to Students (COPETAGS)
Author : Michael Elias
Discipline: Chemistry, Data Processing

PROBLEM STATEMENT

Multiple choice tests will be given and the answers are to be recorded on mark-sense cards. (The cards will be prepunched with the students' names and numbers). The cards' marks are transcribed to holes and fed into the computer with the correct answers to the test (the answer key). The tests are corrected and each student's name and mark achieved are printed. When all class marks are tallied, an evaluation of the test is printed.

METHODOLOGY

The system includes taking a class roll and prepunching mark sense cards to correspond to this roll. (Several copies are prepared for each student and anticipated for future use). Multiple choice test responses by students are checked on the mark sense cards using a special pencil, then collected and sent to EDP where the marks are transcribed to holes. (The instructor will mark an answer key in the above manner to be transcribed at the same time). The answer key is stored in the CPU and each student record is compared to it, and the student's name, number right and percent right are printed. While correcting each answer card, a record is also being kept of which response to each question was chosen. After all classes are corrected for a given test, a report is printed showing, for each question:

1. The question number
2. The number of people choosing
3. The correct response
4. The percent choosing the correct response.

This will be followed by the total number of people taking this test.

OBJECTIVES

This solution would include record layouts for pre-punched mark sense cards, answer key mark sense cards, and both kinds of output reports (class marks and test evaluation). Also to be included are the program flowchart and actual program to complete the operation.

Title: Attendance Record Keeping for Hazleton Senior
High School
Author: Lawrence C. Evangelista
Discipline: Secondary School Administration

PROBLEM STATEMENT

Public schools of Pennsylvania are required by state law to keep attendance records according to a prescribed method.

The purpose is to control the attendance of students falling in certain age groups, for whom attendance is compulsory. Parents are subject to legal action if the law is not obeyed. Attendance registers are legal documents, properly certified by the teacher, principal and superintendent verifying attendance and may be subpeonaed by the courts. The allocation of state aid is based on student membership plus other related factors. Certain statistics are derived from attendance figures which are used to analyze Pennsylvania student characteristics (children entering not of compulsory age, number of students absent for reasons other than legal, number of cases of tardiness, and the like).

In Pennsylvania schools these reports are required at intervals of each sixty day period. This means reports are compiled three times a school year plus a final report at the end of the term.

METHODOLOGY

The Pennsylvania Department of Education has approved the use of machine methods for preparation of reports and totals based on the register entries.

Many schools use data processing for these reports. Since our new vocational-technical school purchased the necessary data processing equipment, attendance reports will be done by the data processing personnel of the school district. However, since our high school is the largest school in the district, the attendance reports will have to be designed to fit our situation as well as the other schools in the district. There are many procedures which can produce the desired results. The principal of the high school would be the responsible person to select the procedure which best satisfies the needs of the school.

The research I intend to conduct will use:

1. The attendance problem worked in this course earlier in the term.

2. Consultation with our data processing personnel
3. Books
    a. Using EDP Effectively in Your School - O'Connor and Tirello
    b. Educational Data Processing - Kaimann and Marker

OBJECTIVES

1. To provide attendance reporting by means of data processing techniques for Hazleton Senior High School.
2. To provide a list of students who are chronically absent or late for school for attendance officers, home and school visitors, teachers, vice-principal and principal.
3. To provide detection of patterns on a particular student's absences for attendance officers, home and school visitors, homeroom teachers, guidance counselors, vice-principal and principal.
4. To provide the comparison of absences during the present school term with absences of past school terms, particularly in the areas of percentages of chronic absences this term as compared to past terms; and percentages of tardiness this term as compared to past terms.
5. To provide relief from clerical work for the homeroom teacher of the added work responsibility imposed due to the keeping of a Pennsylvania State Attendance Register for students in his homeroom. A data processing system would require the homeroom teacher to record absentees in his homeroom for the morning and afternoon sessions, leaving him free to concentrate his efforts on his teaching aims.
6. To provide reports to all teachers, guidance personnel and others via computer printout of information regarding any individual student, without a long delay imposed by the manual system now in use.

Title: Introduction of a computer application to an
Accounting I class thru comparison of manual payroll
system and computerized payroll system.
Author: William J. Ewasko
Discipline: Business Education

PROBLEM STATEMENT

The purpose of this study is to introduce the students of my Accounting I classes at Coughlin High School to data processing as a tool of the bookkeeper or accountant.

If students do not become aware of the computer and its applications to business, they will be preparing for an obsolete trade.

In a most recent survey of 500 managers across the country, it was reported that 71 percent of the computers in operation are used for handling accounts payable, 66 percent for accounts receivable, 66 percent for payrolls and 45 for inventory control.[1]

METHODOLOGY

Master File Creation

1. Keypunch and verify a set of payroll cards for each employee.
2. Place on the cards in a computer, which will read the data on the cards and record it on magnetic tape.
3. Sort data by department code and then by payroll number.
4. Whenever any employee data changes, Keypunch the new data on cards for use as input for updating the Payroll Master File.

Time Card

1. Computer pre-punches time card for each employee. Computer gets data from payroll master file. Time card is pre-punched with employee's name, payroll number, department number, and date of the pay period.
2. Forward time cards to the department heads.
3. Place time cards in the order of their payroll numbers in time clock racks.

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[1] Lewis E. Lachter, "Trends and Forecasts: 1968 -- Closer Manager/EDP Interaction, "Administrative Management", January, 1968, p. 28-30.

4. Employees use time cards each day to record the time worked.
5. Employees sign time cards and give to department heads.
6. Department heads total number of hours worked and sign cards.
7. Department heads forward all time cards to payroll department.

Paychecks and Statements

1. Calculate and write hours on cards.
2. Keypunch the hours into the cards.
3. Sort time cards by department and payroll number.
4. Sorted time cards and Master tape are processed by the computer. The payroll program in the computer performs all the calculations necessary to produce data for each Group 1 and 2 time cards. It prints a check and statement for each employee. It also calculates the cumulative earnings and deductions data and prepares an updated Master Payroll File. A second tape is produced for the data to be printed on the payroll journal.
5. Payroll journal is printed from the second tape produced in step 6.
6. Check-signing machine to sign checks.
7. Time cards filed with previous time cards to serve as employees earning record.

MANUAL SYSTEM

EMPLOYEE-EARNING RECORD

1. Fill out an employee-earning record for each employee.
2. Fill employee-earning record by department and payroll number.
3. Updated employee-earning record as needed.

TIME CARD

1. Each department receives blank time cards.
2. Employee's name, payroll number, department number, and date of pay period as manually entered.
3. Time cards placed in racks according to payroll number.
4. Employees used time cards daily to record hours worked.
5. Sign time cards at end of pay period.
6. Department heads total, sign and forward time cards to payroll department.

PAYCHECKS AND STATEMENTS

1. Separate time cards into two groups. Group 1 worked standard workweek; group 2 worked overtime or under 40 hours.
2. Calculate and write hours on cards from group 2.
3. Sort group 2 cards by department and payroll numbers.
4. Look up and post hourly rate, withholding class, and overtime rate to time card.
5. Calculate regular pay by multiplying regular hours by regular rate. Calculate overtime by multiplying overtime hours by overtime rate. Calculate gross pay by adding regular and overtime pay.
6. Determine Federal income tax and social security tax from tax table and post to time cards.
7. Sort Group 1 and 2 time cards by department number and then, by payroll number within each department.
8. Post information from time card to employee-earning record and payroll journal.
9. Make check and statement.
10. Repeat steps 8 and 9 for each employee.
11. Sign checks.
    Quarterly and year-to-date cumulative figured on earnings and deductions must be calculated separately and recorded to the employees-earning record.

OBJECTIVES

1. To include automated data processing principles in the Accounting I course.
2. To present up-to-date material in the curriculum.
3. To give the student the opportunity to review and learn something new at the same time.
4. To give the students a chance to test their learning by making applications similar to those that will have to be made once they enter the business world.

Title: Computer Assisted Numerical Control Programming
Author: Stanley Fidrych - Joseph Wazenski
Discipline: Machine Shop, Design & Drawing

PROBLEM STATEMENT

Although programming for most parts requires point to point machining can be successfully and econcmically performed manually, certain configuration of hole patterns lend themselves nicely to computer programming.

Calculating the X and Y coordinates of the hole pattern would be time consuming requiring trigonometric tables in order to determine the signs and cosigns of the numerous triangles about the center of circular pattern.

METHODOLOGY

The computer program will consist of key punched cards describing the particulars of the hole pattern. The computer after accepting theses cards will calculate the X and Y coordinates of the hole center, key punch card describing punched tape format and special machine functions will be processed in the computer.

OBJECTIVES

Write a program - the purpose of this program is to attempt to solve the trigonometric functions illustrated on the print. This knowledge gained, can be applied to our disciplines, machine shop numerical control machining and drafting for numerical control machining.

Numerical Controls

The computer after accepting the above instruction, calculates all of the necessary X and Y coordinates of the hole center in addition to specifying special machine notations on the computer cards. The calculated cards are then processed through a card to tape converter which automatically prepares finished tape.

Along with the program for a specific part, it is necessary that the computer be primed by inserting general information and generalized math. Data which will enable the computer to accept and calculate the information describing the particular part.

Objective

Although more steps are involved when utilizing a computer for assistance in preparing tapes, the overall length of time required is generally far less since computers have the capability of performing calculations in minutes. The program is less detailed and contains far fewer calculations.

Title: Gage Control by Computer
Authors: Stanley Fidrych - Joseph Wazenski
Discipline: Machine Shop, Design & Drawing

PROBLEM STATEMENT

There is an inventory of 100,000 measuring devices flowing through several gage cribs at a plant, at a rate in excess of 10,000 per week.

At the present time, every man needing a gage is required to fill out a quadruplicate snap-out requisition form, and give it to the tool crib attendant who locates the gage, pulls the inspection gage -- inspection card file from file, fills out the card and copies of the snap-out form on follow-up file.

METHODOLOGY

Key punch 100,000 cards and sort sequentially by gage number. Then store on master file to be used for weekly printout.

In programming for a weekly precision equipment recall report, serialized gage withdrawal forms are sent to the data processing department for keypunch and card input to master file to the computer.

When a gage is returned to the tool crib, a duplicate serialized form is routed to the computer room to be keypunched. That card against the original charge out card is processed.

A weekly printout, identifying gages charge out by operator, organization, foreman, department, and gages overdue for inspection are sent to each department foreman.

OBJECTIVE

Produce a weekly printout, identifying gages charged out by operator, organization, foreman, the department, tergeting not only the gages overdue for inspection, but also pin-pointing any gages due for calibration during the coming week. It becomes a constant warning system.

Title: Correcting French Vocabulary Tests
Author: Sebastian Gattuso
Discipline: French

PROBLEM STATEMENT

A list of vocabulary words will be given to the students in multiple choice form. Accompanying the test will be an 80 column card on which the student will mark his answer. There will also be columns set aside to record the student's name, class, grade and number.

METHODOLOGY

The card after being sorted by student number, grade and class, will be read by the CPU, which is programmed to print out the student's grade, showing number of right, number of wrong and a percentage correct.

OBJECTIVES

The objectives of the study will be an alphabetical print-out of grades received by the students, and also a print-out of the total words wrong for each test. Theoretically it will first of all eliminate some of the busy work for the teacher, secondly, it will give the teacher a better idea of what words are missed most often by students and consequently the teacher will know on which words to place more emphasis. Also, the system could be expanded to correct all forms of French tests, i.e., different forms of French grammar and literature.

Title: A Study to Expand the Present System of Grade Reporting
to Produce a CUM in the Major Discipline.
Author: Sister Mary Luke Gibbons, R.S.M.
Discipline: Business Education

PROBLEM STATEMENT

The present system of grade reporting at the college produces a Student Grade Report with a Quality Point Average Cum. This "Cum" includes quality points earned in the major discipline and in the minor and/or related disciplines as well as in an over-all total.

The object of this study is to expand this system so that the "Cum" will be presented in two parts: Major Discipline Cum, and Over-all Cum.

Admission to student teaching is based on the Major Discipline Cum. Under the present system, the department chairman must manually calculate this figure based on grades earned over a 5-semester period.

METHODOLOGY

The source deck of cards for this study will be the student deck which includes: punched grade cards, name and address card, cum cards, course cards and major cards.

In order to produce the cum in the Major Discipline, I think a new card will have to be punched to show the courses taken in the major, grades earned in each major course, quality points, etc. This punched major discipline cum card deck would be used to get a printout for each department.

A Systems Flow Chart will be set up, as well as a Detail Flow Chart.

The documentation for the system will be written, and if time permits, I would like to write the program.

OBJECTIVE

The objective of this study is to produce a Student Grade Report which will show the "Cum" earned in the Major Discipline as well as the Over-all Cum. This Major Discipline Cum Report would be in the form of a printout.

Title: CAI Program Long Vowel $\bar{A}$
Author: Mrs. Sophie Good
Discipline: Elementary Education

PROBLEM STATEMENT

Formulate a program for children that will help them to become independent readers through the use and recognition of letter sounds. My problem will be a program in the recognition of long form of the vowel $\bar{a}$, with future expansion to other vowels and consonants.

METHODOLOGY

The drill will have a time limit. Frame I will be presented to each child with instructions preceding the presentation of frames. If a child does frame one correctly he will be allowed to frame II, if he is incorrect the procedure program will tell him it is incorrect and to try again presenting Frame I again. If on the second try the child is correct, he will proceed to frame II, if again he is incorrect, procedure program will tell computer to present Frame I with correct answer. If child answers all questions correctly he will be allowed to do harder drill in his next session at the console.

OBJECTIVES

1. To have children gain the capability to recognize the long sound of vowel $\bar{a}$.
2. To expand the program in future to include the rest of the long sounds of the rest of the vowels.

Output

Teacher's report of individual child's daily drill, length of time, number of trys, number right, number wrong.

Title: Computerized Attendance Accounting System for
Dallas Senior High School
Author: Arthur D. Hontz
Discipline: Business Education

PROBLEM STATEMENT

This problem will consist of converting the manual operations of putting out a daily absentee bulletin, and computing three sixty-day state reports to a computer operated system for the Dallas Senior High School -- the state reports and attendance registers are currently done by myself manually.

METHODOLOGY

To convert to a computerized system, the following procedure will be necessary:

1. Develop a systems flowchart for the entire process beginning with the taking of the attendance by the teacher to the final reports.
2. Develop a master file punched on cards and eventually put on to tape.
3. Develop the following layouts:
    a. Layout for the original master file
    b. Layout cards for any additions, deletions, and changes.
    c. Printer layouts for the daily bulletin, 1st 60-day report, 2nd 60-day report, final report at end of year.

OBJECTIVES

To create a system which will take the clerical work away from the teachers and give them more time for teaching.

Title: Analysis and Reports of the Textbooks and Instructional Materials for the Elementary School
Author: Charles C. James
Discipline: Elementary School Administration

PROBLEM STATEMENT

An attempt will be made to develop a program to be stored and updated on textbooks used in the Elementary Schools at Lake Lehman. The complete program will take each series of books used from K-6 grades by subject material. The system to be developed will be for keeping a running account on the condition and replacement necessary for each school year.

The final report will be for the Superintendent and Elementary Director for planning the next year's budget.

METHODOLOGY

1. First develop a complete inventory of books presently used in the system. This will be by subject and grade level. The category code of the various subjects is given below:

100	Reading
200	Math
300	Social studies
400	English
500	Science
600	Spelling
700	Music
800	Health

2. A card will have to be developed for each subject by code number, company, quantity, quality, cost at purchase, cost at present, date to be revised.
3. A report of the total system will be made for the Superintendent and Elementary Director in January each year for budget purposes.
4. A final report will be made in May for the exact number of books to be purchased.

OBJECTIVES

1. Develop a report showing the needs for the next school year's budget.
2. Show the increasing cost of books over the previous year.
3. Show in the report when a particular book series will have to be revised for future years. Give estimated date of replacement.

Title: CAI - Fractional Parts Identification
Author: Frederick F. Kepner
Discipline: Elementary Supervision & Curriculum

PROBLEM STATEMENT

Individually Prescribed Instruction in mathematics is a system of instruction based on approximately 400 behaviorally written objectives.

A placement test is given which indicates in which area, and level of mathematics the student should begin working a particular unit.

Before beginning the unit, a child takes a pre-test, which contains samples of all the skills taught in the unit. Work will be assigned in every skill of the unit in which the pre-test score is less than 85%.

While working in a skill area, the child may be doing well. The teacher can then prescribe a curriculum embedded test which could indicate at 85% or above the child's ability to move on to the next skill within the unit.

When the child has completed the unit, by attaining 85% on all the C.E.T.'s on all the skills within the unit, he is given a Post-test on the unit. The Post-test is actually another form of the Pre-test.

The student must score 85% on the post-test before he is allowed to move on to the next skill area in the mathematics continuum.

The problem which interests me would be concerned with placing the IPI continuum of objectives and materials on a computer.

At the present time a paper medium workbook format, is the vehicle of instruction.

I have available a statement containing the behavorial objectives, and sample work materials for the IPI continuum.

My initial plans are to read about CAI, confer with the course instructor, and become more familiar with PLANIT.

Title: CMI Program in Office Practice
Author: Mrs. Marjorie Kepner
Discipline: Business Education

PROBLEM STATEMENT

The office practice course of the city schools will use the computer to help teach its office machines unit in a CMI program. A master file of all the business students will be made. From the master file individual student profile reports will be made and are to be used by the business coordinator to make student assignments for the office work program. The master file will be on tape. The CMI program will be on disks. Each of the three city high schools will have separate student profiles since the class ranks are by individual high schools and the records in the guidance offices are by individual high schools.

The CMI program will be used in all three of the city schools.

METHODOLOGY

1. Flowchart of the System
2. The first step in starting my CMI program will be to create a master tape file of all senior business students. The class grade book will be the source document for this file. (All business students are required to take office practice during their senior year.) A student record layout will be included for the punched card to create the tape file. The layout for the tape file will also be included.

3. The student business subject grades which will be included on the master record will be placed on a mark-sensed grade card by the teachers and placed on the master file at the end of each interval. A layout for the mark-sensed card will be planned.

4. The student profile report layout will be included. This individual student profile is to be placed on a punched card so the business coordinator can easily and quickly check the background information for each student as it is necessary. The students do not go out on the office work program at one time. Assignments are made as the jobs come along. The student profile record is to be placed on microfilm upon the students graduation and kept in each school's guidance department.

5. The CMI information for Office Machines Course will be placed on disks. I want to include layouts for machine assignments for six different machines - rotary calculator, ten-key and full-keyboard add, ten-key printing calculator, keypunch and duplicators.

   Since a test will be taken to evaluate student's understanding of each machine, I would like to include the layout for each machine test.

6 . The outline and requirements of the other units of study in office practice will be on one report. If possible, I would like to include a layout for this report. If I have to cut down on the system, I would drop this report layout. This record would be stored on disk also.

7. If I must write a program, I would take one of the simple programs in the system. Example: Putting student grades on master file or program to print student profile report.

OBJECTIVES

All the information which I am planning in my system is a part of the course which I am teaching at the present time. Maybe some time in the future I would be able to use the layouts if a computer would be available for the city schools.

I plan to use the student profile records at the present time. I hope I can work out a suitable card layout that we can use to record the necessary student profile record so this information can be printed on a card of IBM size and given to the coordinator for her file.

Title: EDP of Accounts Receivable
Author: Joseph Kundla
Discipline: Business Education

PROBLEM STATEMENT

An accounts receivable operation must consist of a series of logical accounting steps. Basically, these steps include the following:

1. Analysis and classification of all accounts receivable transactions, including charges for merchandise sold, cash receipts, and journal entries are entered into the system through punched cards. Use of the standard input card simplifies input data preparation and control. Furthermore, use of the standard card for all types of transactions provides an easily accessible audit trail to the source document.
2. Validation, identification, and assignment of all transactions and payments to the respective accounts.
3. Updating all payments and account information.
4. Determining debits and credits and assigning them to the proper customer's account.
5. Reporting on all facets of the accounts receivable operation.
6. Maintaining and preparing accurate billing statements for all customer accounts.
7. Establishing a method of checks and balances that will assure the accuracy of the entire operation.

Required reports:

Daily: Billing Invoice. This report will include the name and address of the customer, terms, customer number, shipped via, customer order no., invoice number, invoice date, product number, description of product, quantity, unit price, and amount. Total amount due on each invoice is also noted.

Daily: Transaction Register. The report will contain the customer name, customer number, amount, product, date, invoice number and total amount of invoice. The total of each invoice will be transferred to the debit side of the customer account when the subsidiary ledger account is updated and new balance is determined.

Daily: Cycle billing. Cycle billing distributes evenly throughout the month the work connected with the preparation and the mailing of monthly statements of accounts receivable. The statements are mailed to different groups of customers at various times during a one-month period. For example, statements to customers in the alphabetic group A-B are sent out on the first mailing day of each month. On the next day, statements are mailed for the C-D group, etc.

Monthly: Aged Trial Balance. The last balance in each open account is used as a check and is in balance with the control account in the general ledger.

METHODOLOGY

1. My own notes:
    a. Flow charts, programs, and any notes available that will aid me in arriving at a solution to the problem.
    b. Honeywell: Notes I have made from reading #0-A12.
    c. Automated Accounting by Randall, Weimer, Greenfield, Chapter 29, Accounts Receivable and Billing Applications, pages 447-513.
    d. Systems and Procedures for Business Data Processing, Randall and Burgly, Pages 453-500.
    e. Flow Chart: Figure 2-1, Honeywell.

OBJECTIVES

To prepare the necessary flowcharts, input/output layouts that will aid me in the finalization of a workable classroom problem on accounts receivable - either for text books application or any practice set used. The problem must be detailed enough to show the merits of computer use in relation to manual record keeping. Yet, the solution as planned must be simple enough for my students to understand. It must be shown that this problem solution is applicable in any business.

Title: Book and Supply Inventory
Author: Eva Lipiec
Discipline: Business Education

PROBLEM STATEMENT

An actual inventory of books and supplies used in my department at school.

METHODOLOGY

The inventory will be by actual count of books and supplies on hand.

Mark sense IBM cards will be used in taking the inventory. The inventory list will be written and coded. A code list will be made.

All information will be on IBM cards. A card inventory master file layout will be made and a flow chart showing input and output of this problem.

Cards will be punched and read.

A copy is enclosed of the printer layout for the inventory status report.

OBJECTIVES

I hope to extend the output to include possibly: amount in useable condition, amount in poor condition (useable 1 more year only). I do not need information on these books in my reports, but it would be very helpful to the teachers.

The output will also be extended to show the number of books -- on hand in September . Lost --discarded and balance on hand in January and in June. We check books in January and June.

Title: A CAI Course for Quadratic Equations
Author: Robert Marr
Discipline: Mathematics

PROBLEM STATEMENT

The purpose of this problem is to write a CAI course which will help students achieve a better understanding of Quadratic Equations.

METHODOLOGY

Before the actual quadratics are studied a short review of taking square roots and also squaring numbers will be given. The definition of a quadratic will be given and also the general form of its equation. The methods that will be studied will be: factoring, completing the square, and solving by using the formula. Each method will be explained making use of various examples. After each phase or method a short group of problems will be presented to test for retention of knowledge. If the correct answers are received on these tests then the student will proceed to the next phase. If not, a group of easier problems and also a review of the same phase will be presented. Also an additional project of the program will be to write a flowchart for solving a quadratic equation by means of the computer.

OBJECTIVES

Some of the main objectives of this program are to enable the student or students who are having difficulty in solving quadratics to go to the computer and request this CAI program. By using this program the student can progress at his own individual rate and test himself by self-administered tests incorporated in the program. This course can be available to any student (i.e. any in chemistry, physics, biology, etc.) not necessarily only those taking a math course at the particular time. Also this program can relieve the teacher of much remedial work which may have to be given to particular students. After an individual student has completed this program a report will be made by the computer and sent to this student's teacher to show what progress has been made. If a teacher in a subject area other than math finds a student has difficulty in these equations, the teacher can request that the student take this CAI course during his free or study periods in order to bring him up to date.

Another objective of this program is to help the slow learning students who do take math courses or any other courses involving quadratics and provide a better opportunity to learn these type equations at their own individual rates. Many programs are designed for the college prep student but I feel that the average or slow learning student is the one who needs the most help. Therefore, this program is designed mainly for the latter types of students.

Title: The Trigonometric Functions
A Computer-Assisted Program
Author: A. Millard
Discipline: Mathematics

PROBLEM STATEMENT

This program, following the attached outline, is to be a carefully designed computer-assisted program. It is to be designed to benefit both the slow learner and the fast learner. It will contain information to be learned, provide review, restatement, and practice. It will be in itself a self-contained teaching instrument.

METHODOLOGY

Source documents will be gathered from various mathematics textbooks and periodicals. This material will be evaluated as to its value to the program and that which is chosen will be put in the proper format by the writer. The material will then be keypunched and verified. After being processed by the C.P.U. it will be stored on disks, and will be called a CAI instructional learning program. A terminal will be connected to the C.P.U. There will be two-way communication between the C.P.U. and the CAI program and the C.P.U. and the terminal. The program will be written in sequential frames, with branching to allow for the progress and ability of the learner. The illustrations accompanying the frames will be placed on slides. Flowcharts will accompany each frame.

OBJECTIVES

The end objective is to produce a workable CAI program and one which, lacking computer facilities, could be transformed into a good programmed instruction course.

PROBLEM OUTLINE

I. Arc Length
II. Paths and the wrapping function
III. Unit circle reference points

Case I. The coordinates of the four terminal points.
Case II. Bisect each arc in each of the four quadrants.
Case III.Trisect each arc in each of the four quadrants.

IV. The cosine function
V. The sine function.
VI. The tangent function
VII. The reciprocal functions.

This problem from this point could be expanded to include the identities, and, in fact, an entire course in trigonometry.

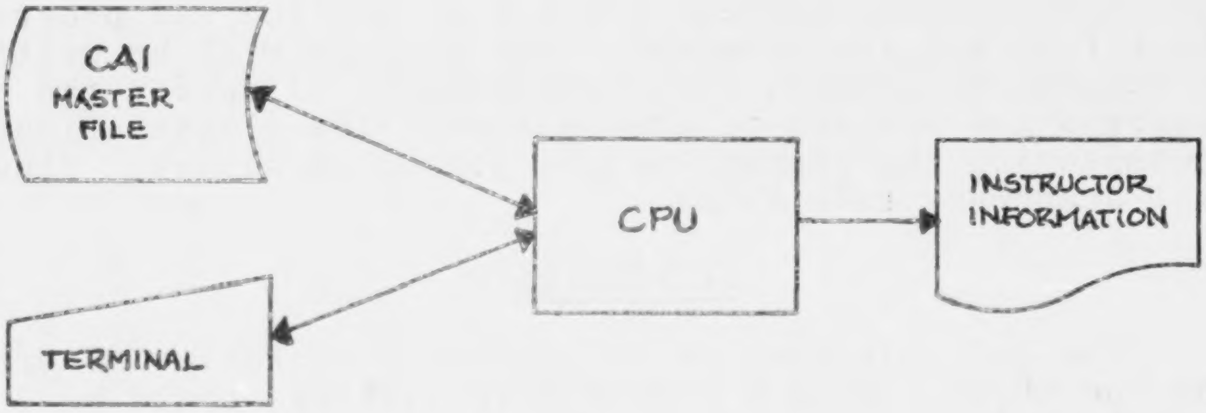
Title: Industrial Arts Education
Author: Edward S. Miscavage
Discipline: Industrial Arts

PROBLEM STATEMENT

The most difficult part of vocational and industrial arts education is the beginning month. The type of boy that is sent to the shop needs much repetition, and I feel with the computer speed this can be accomplished. Once a boy establishes the fundamentals of tool recognition and usage, he has a better chance of becoming a more informed and productive student. Some of the work load is therefore off the instructor to allow him to give more time to individual instruction, which is greatly needed in our shops.

METHODOLOGY

Use of text books, through experiences on the job, as seen through the eyes of the instructor. Photos shall be used along with the computer. This should allow students to move as fast as his intelligence allows.



OBJECTIVES

1. Giving the student repetitive work to bring about a more informed and eventually a better student.
2. More instructor time for individual instruction.
3. Less boredom.

Title: The Use of the Computer in Chemistry Education
Author: Peter W. Mischak
Discipline: Chemistry

PROBLEM STATEMENT

The computer in my system will be used in connection with student-teletype terminals with a typewriter keyboard on which "drill and practice" exercises, such as balancing equations, solving problems, naming compounds, writing compounds, etc. will be presented to the students. These terminals will allow each student immediate reinforcement. In addition to the "drill and practice" exercises the terminals will be used to present tests. When the test is finished, the computer will calculate the number of correct responses and print the % of correct answers at the bottom of the paper. (This will also be done during daily exercises). The student will then tear off the paper and present it to the teacher before he leaves the room. The teacher then merely records the mark in his roll book.

METHODOLOGY

I will search the literature pertaining to CAI in school situations to see if any previous work done in the field is related to my project. When the time would arrive, in an actual situation, to program the exercises to be worked on by the students, I would pick out problems from various books or think up problems to present to the students by means of CAI that would pertain to what I went over in class previously. The CAI "drill and practice" exercises I would use would be based on what has been presented in class. (Flow charts of the system will be worked out and handed in at the completion of the project.)

OBJECTIVES

The student is able to proceed at his own rate with immediate reinforcement. Each student has, in a sense, his own teacher which is an ideal teaching situation. The teacher is free to do something else in the meantime instead of walking around and correcting the work of the various individuals; the computer is doing that. In addition the computer can be programmed to show the teacher by means of printed results on the teletype sheet that the student hands in at the end of the lessons, which questions are too hard by too many having it wrong or where additional class time should be spent on a certain topic. Also since the CAI system can be used to administer and correct tests much time consuming work of the teachers can be eliminated and the time can be used for more important jobs.

Title: Data Processing System for Professional Personnel
Profile of the Wilkes-Barre City School District - 1969
Author: Joseph A. Peel
Discipline: Secondary School Administration

PROBLEM STATEMENT

To devise an efficient data processing system of personnel profiles for the 517 professional employees of the Wilkes-Barre City School District. The system shall be so designed to produce periodic reports as follows:

1. A yearly report - Professional Personnel Report
2. Educational Status Report
3. Professional Assignment Assessment Report

METHODOLOGY

The professional personnel record file shall consist of information pertaining to the following areas for each professional employee:

1. Employee's name
2. Employee's address
3. Employee's social security number
4. Employee's retirement account number
5. Sex
6. Marital status
7. Level of education attained
8. Years of professional service
9. Certification held
10. Total years certificate held
11. Areas of certification
12. Position assignment
13. Teaching assignment
14. Building assigned
15. Leave data
16. Date of birth
17. Accumulated sick leave

This information shall be secured from various sources, namely:

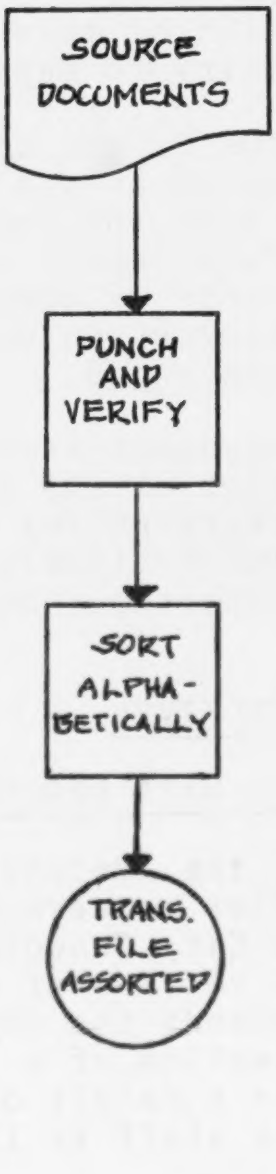
1. Personal interview
2. Questionnaires
3. College transcripts
4. School assignment rosters
5. Teacher application a/o interview forms
6. Current teacher files being maintained in Administrative Office

MAINTENANCE OF MASTER FILE

To maintain the master file it will be necessary to add records for new teachers, delete records of teachers resigning or retiring and make changes to update the lists of data on each record. A transaction file will be created at least three times during the calendar year. Updating should be in the months of September, February and June as most of the normal changes should occur just prior to these months.

Changes should occur regularly in educational level, address area, marital status, years of service, certification and sporadically in the other areas.

Flow Chart for Transaction File


SOURCE DOCUMENTS
PUNCH AND VERIFY
SORT ALPHA-BETICALLY
TRANS. FILE ASSORTED

AUXILIARY FILE

Since it is necessary to refer quite regularly to files of teachers, who have left the service of the district, it is planned to keep an inactive file of the records of those teachers. The record for these teachers would have an additional entry giving the reason for the separation from employment. (Such as Retirement, Death, Marriage, Etc.) This file would also be sorted alphabetically for easier maintenance and access.

REPORTS TO BE PRODUCED

1. Professional Personnel Report will be produced once a year during the month of October as a complete report on all professional personnel. The report will contain an alphabetical listing and report on the status of each professional employee in seventeen general areas listed previously in the Methodology Section of this report. This report would be used in reporting to Department of Education.

2. Educational Status Report will be produced during month of November as an aid to the administrators of district and also for reporting to various research institutions. This report would be an analysis report giving levels of education and percentages of professional employees on each level. List would be alphabetically sequenced.

3. Professional Assignment Assessment Report would give a comparison report of the areas of certification and position assignment for each professional employee. List would be alphabetically sequenced and distributed to principals, department heads and central curriculum office.

OBJECTIVES

ADVANTAGES TO DISTRICT FOR DATA PROCESSING

At the present time, the Administrative Staff is limited in making evaluative studies concerning the professional staff of the Wilkes-Barre City Schools. To secure data items from the individual records of each professional employee is now a process which demands the expenditure of a large amount of time or the attention of a larger force of clerks than is now available. As a result of this, statistical information concerning the staff is limited to those reports absolutely required.

Should a professional profile system be established on data processing it would be possible to pull data concerning many critical areas and have statistical status reports to use as evaluative criteria, planning information and to serve as information to those responsible for certification and assignment.

The capability of being able to maintain an updated history for all professional employees will permit rapid and accurate reports on statistics as required at intervals by the Department of Education and educational institutions engaged in study and research.

The ability to secure reports giving status on degree of certification now requires a large amount of time to secure and is often neglected or done inaccurately.

The basic system here suggested could be expanded in the future to meet the increasing demands for statistics pertaining to the professional staff. As the higher echelons have their files placed on data processing they will be requiring more reports than are now required.

Title: Graded Word Study of Current Spanish Textbooks
Author: Joseph Petrenchak
Discipline: Spanish, English

PROBLEM STATEMENT

Since there are several Spanish textbooks in use in the United States, each with a varying vocabulary, there is a problem of vocabulary familiarity for students involved in national testing programs. The College Board Achievement Tests in Spanish are therefore a logical place to develop a listing of vocabulary words which will be included in the testing program. This problem, therefore, is one which I propose to develop for the Educational Testing Service in Princeton, New Jersey, who conduct the College Board Achievement Tests.

METHODOLOGY

Research will be conducted in the follwoing manner:

1. All current Spanish texts will be collected.
2. Spanish to English sections in the appendices will be reviewed and each Spanish word will be coded, keypunched and transferred to tape files. Then they will be ranked according to their frequency of usage.
3. I will attempt to develop the systems flowcharts for this project as well as the input/output layouts (and detail program flow charts).

OBJECTIVES

To develop a listing of the words most commonly used in the vocabulary sections of Spanish texts in order that this may be used as a study guide for the national testing program.

Title: Grade Reporting
Author: Robert Powell
Discipline: Data Processing

PROBLEM STATEMENT

To prepare a report card that will be more accurate, provide more meaningful data, neater in appearance, and require less effort by teachers.

My application will be grade reporting for five schools on the Junior-Senior high school level. There are approximately 6,000 students and grade reporting will be done on a 9-week basis.

METHODOLOGY

I am presently performing the above application with the use of unit record equipment. I would like to take my present system and revise it into a computer system. With my present system, everything is restricted to unit record principles. By using a computer for this application I will utilize disk storage and thus eliminate some card processing factors that are necessary when using audit record system.

OBJECTIVES

I feel that grade reporting performed by a computer will eliminate some of the work for the teacher using my unit record system. A computer will also eliminate a lot of my time that is spent in card handling. For example, I presently need two header cards. By using a computer with disk, I could eliminate one header by using working storage and eliminate the other by putting the other header card (name, number, grade-section, etc) on disk prior to the actual record card run.

I will start by revising my present system flow. Then make a detail flowchart for the necessary programs. Next, will be the layouts for input and output, and then a record design will be needed. The last phase will be programming for processing the record card.

My final objective is to design a grade reporting system that will provide more features (such as quality point average) and take less processing time.

Title: Figuring Net Pay By Computer
Author: Margaret Ann Price
Discipline: Business Education

PROBLEM STATEMENT

Finding the net pay for each employee. The information that you have is the number of dependents, the hours worked, the hourly rate, the deductions from the gross pay would include FICA, withholding tax, savings bonds, Union dues.

METHODOLOGY

Master file with each employee listed on it by their employee number which would be on tape. I will use a record layout to show the set up of the Master file.

Take a card with the employees hours worked for the week plus his rate also a printer layout of the card. The computer will figure out the net pay. Then from the information on the Master file, there will be a program for figuring out the net pay or take home pay after deductions have been made. I will use printer layouts and flow charts.

The output will be an updated Master file on tape plus the employees checks and a printed list of employees which I will give a printer layout to show the information. This will be the Payroll Register. I will also do a layout for the check.

I would like to design a mark sense card as an input for the number of hours worked and the rate. The end result would be the net pay.

OBJECTIVES

I would use this problem in my business math and accounting classes to show the classes how easy it would be to figure out the take home pay by computer compared to figuring it out manually.

Title: Guidance, Health and Permanent Record
Author: Zack C. Riehl
Discipline: Elementary Education

PROBLEM STATEMENT

This problem will be to develop a report containing a student's health record, guidance record and permanent record to be distributed to those who are involved.

METHODOLOGY

The research for this paper will be to use all information pertaining to these records which are distributed by the education offices in Harrisburg. The information will be taken from these various papers and combined together into one report rather than three or more reports. A flowchart will be included in the problem.

OBJECTIVES

1. To develop a master-file containing student's name, number, school, grade, aptitude test results and grade, permanent record marks and health record.
2. To produce a report for involved teachers by school, grade, section and rank on test results from highest to lowest.
3. To produce reports for guidance, administration, teachers and nurses. The first report will be by grade and alphabetical order. The second will be by rank within grade.
4. To produce a report giving the mean and standard deviation of test results for each grade.
5. It can be used to compare test results with academic work.
6. To produce an exceptions file of student's name on card but not on master-file, on master-file but no test results, marks or health information. Also, to give students who are above or below average test results.
7. To produce on the report a code which will distinguish a migrant worker from a regular entry. This will be extremely helpful for schools where the student came from and where he is going.

Title: Book Reporting
Author: Dorothy Rother
Discipline: English, Mathematics

PROBLEM STATEMENT

Since many books have a tendency to be lost, stolen or mutilated, I would like to keep a record of all 12th grade English books and the condition each one is in when the student receives it. This will be accomplished by printing a label that will be put in each book and then printing a listing of all the information for each teacher issuing the books.

I now do this manually for my own students.

METHODOLOGY

Information needed:

A. Student identification
  1. Name
  2. Homeroom

B. Course Code #

C. Course Title #

D. Course Teacher #

E. Year book is issued

F. Book #

G. Condition Code #

Source document would be a card deck. Flow chart and programs will have to be developed in order to carry out the program.

OBJECTIVES

Students are much more careful with their books when they know they cannot turn in any book but the one issued. I feel that this would entail a great savings for the district at the end of each year.

Title: A System for Studying the Effect of Sleep on Learning
Author: Nancy Rovinski
Discipline: Psychology

PROBLEM STATEMENT

Since the proper amount of sleep as well as none -- fatigue--do influence our learning, judgment, recall and retention areas of memory and since everyone does dream when asleep, I propose that there is a definite relationship between dreams and our mental capacity, learning process, and behaviour process.

Deprivation of sleep (alcohol and excessive barbiturates) cause irritability, restlessness, depressions, schizophrenic individuals.

METHODOLOGY

There is a need for a Central Computer and terminals to maintain a cooperative interacting system of some 60 Research Projects, established by the National Institute of Mental Health across the country studying sleep and dreams.

1. Source - Dr. Gall has only begun -- but has assembled 100,000 dreams in men and women of varying ages, different national and ethnic backgrounds and religious affiliation.

2. Source - Statistical analysis of objects and persons appearing in the dreams how they behave, what properties they have, and how they and the dreamer interract.
3. Source - Electroencephalograph reports -- showing what a dream looks like, when it occurs, for how long.

   Tests

4. Source - Other research data -- all to get a new light on causes and possible cure of mental illness, reliable physiological indicators of mental illness, more knowledge of exactly how the brain functions.

Title: The use of CAI to Introduce the Basic Concepts of Music Theory
Author: Miriam Sable
Discipline: Music

PROBLEM STATEMENT

To introduce the basic concepts of music theory, such as: note names and values.

Syllables, numerals, and letters as aids to reading music major and minor scales and their structure. (The 2 general categories above are 1. Tonal 2. Rhythmic). Through the use of:

1. A student manual consisting of:
    a. 8" x 11" sheets which explain charts and relationships (a pamphlet or folder)

2. A classroom Display Set consisting of:
    a. 24" x 36" charts which are replicas of student manual charts. Since music is often a group activity (as when CHORUS, BAND or ORCHESTRA is scheduled) these classroom charts could be used to recall and reinforce theory (as presented in the manual and in the CAI program) when it is actually being used in the production of music.
    b. 8" x 11" sheets which offer instruction for use of these sets - in conjunction with the CAI program - as well as in conjunction with physical response to this material.

3. A basic Music Theory PROGRAM (based on materials on Charts) written in RCA Language (since there might be a possibility that facilities could be available locally) for ultimate use in a CAI situation which reaches grades three, through adults.

METHODOLOGY

Students handbook should be assembled. Areas of theory to be presented and the order of areas should be established and perhaps flow charted.

Major classifications should be chosen. Series of questions for each classification should be written and coded. This should be done so that branching can occur if:

a. a student has a thorough knowledge of materials in each classification.
b. a student needs further drill.

(Examples of possible charts - are found on INSTRUCTO teaching guide.) This product was designed by my husband and myself.

Title: Payroll Problem
Author: N. Sabol
Discipline: Business Education

PROBLEM STATEMENT

To set up an improved payroll system with the following criteria to be used as a guide:

1. Should require a minimum amount of clerical time.
2. Time sheets to be kept by employee and signed by supervisor and turned into payroll department.
3. Payroll to be paid on a bi-weekly basis.
4. Information to be provided so that all Government reports can be compiled as required.
5. Payroll checks to be issued bi-weekly.

To prepare a payroll system for the Elementary-Secondary Education Act Title I Program for the Wilkes Barre City School District.

Approximately 120 employees will be on the payroll. Employees will be in the professional category as well as para-professional such as, teacher aides, library aids and clerks.

METHODOLOGY

1. System flow chart.
2. Information is obtained from the personnel department on each employee.
3. Time cards are set up to keep record of time worked and appropriate time cards are punched for each employee according to Dept. # - Payroll #.
4. Maintenance records are to be kept in order to keep the system updated. Such as New Employees, Change of address, change of exemptions, change of regular rate and overtime rate, change of retirement.
5. New cards to be punched at the end of a pay period to be ready for the next pay period.
6. Output information completion of payroll register and other related information.
7. Make out payroll checks.

OBJECTIVES

Less work for payroll clerk thus relieving clerk for other duties.

Work is accurate and up to date providing much needed information quickly.

Title: An Automated System to be Used by the Wilkes Barre
School District Elementary and Secondary Libraries
Author: Alice Schappert
Discipline: Library Science

PROBLEM STATEMENT

There are presently in the Wilkes Barre City School District 3 secondary school libraries and 13 elementary school libraries. The elementary schools do have some form of central ordering and cataloging, but the three secondary school libraries operate as three completely separate entities. The librarians in each of the high schools purchase, individually, all of the standard cataloging tools, do individual book selection, cataloging and processing. The purpose of this study is to show that ordering and processing could be done centrally by machine for both elementary and secondary schools. This would be a more efficient system and it would relieve the individual librarians of all the duplication of effort which now exists. These automated processes, once developed, could be expanded and applied to routines of circulation, serials processing, etc. It is the hope presently in the Wilkes Barre City Schools that we achieve a higher level of cooperation and interlibrary loan between the individual schools and an automated central system would facilitate this.

METHODOLOGY

Library routines begin with ordering. The librarian examines various tools of the publishing trade and selects, on the basis of the library's present holdings and needs for the future, books to be added to the collection. In an automated system, these orders from the individual librarian would be put on punched cards. Certain information can be placed on these cards initially. Other items would have to be added after the books arrive. This will be explained in more detail. After the punched card has been prepared it would be checked against a master tape file of all library holdings, to make sure that the library which is ordering the item does not already have it. In some cases, if it is a very expensive item, it might be justifiable for the number of copies in the district to be limited and used by all on an interlibrary loan basis. Each school has a certain budget allocation and this would be included on the master file and updated with the payment of each bill. It would be possible to print out at any time a report showing how much money has been allocated to each school and how much has been spent to date.

When the books arrive, the punched cards will be completed and the system will produce catalog cards, shelf lists cards, labels for book pockets and book cards, and spine labels. Since this system as it is designed must include audio-visual materials as well as printed media, the master file must be designed to include all the necessary items of information.

Included will be a flowchart for developing the master file, a record design for the master file, a layout for the punched card which will be the input for updating the master file, printer layouts for labels, catalog cards, and any desired printed reports. The system will include provision for a book catalog, and suggestions for expanding the system to include serials processing and circulation routines. Items to be included on the master file.

* Call No.
Type of media
Author
Title
Publisher
Date of Publication
* No. of pages
List price
Edition
No. of Volumes
Source of selection
Library ordering
* Accession number
* Subject headings
* Date acquired
* Net price
* No. of frames (for filmstrips)
* No. and type of phono-disc (for records)

Starred items, in some instances, would have to be added to the card after the book arrives.

OBJECTIVES

The purpose of this study is to prove that these library processes could be accomplished more efficiently and with less duplication of effort and unnecessary spending if they were to be done by computer. Statistics showing the enrollment and costs per student for library service will be included along with a projection about costs for automation of the system.

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Title: Solution of Simultaneous Equations in the 2nd and
3rd Degree to Reenforce the Classroom Teaching.
Author: Henry W. Shemanski
Discipline: Data Processing

PROBLEM STATEMENT

To aid any number of students in solving 2nd and 3rd degree simultaneous equations through the use of a computer. (Check for traditional method)

METHODOLOGY

This program will be written in the ForTran I Language and tested on the IBM 1620 computer. The solution system will be set up so that a student will simply have to press one button and receive all instructions to enter data necessary for solving his simultaneous equations. Typewriter input will be used.

OBJECTIVES

Result will be: the student will have the solution to his problem plus the knowledge that the computer is a worthwhile tool.

Title: Sales Order Processing
Author: Edward D. Solack
Discipline: Business Education

PROBLEM STATEMENT

It was the purpose of this study:

1. To develop an Electronic Data Processing System that will improve the level of customer services.
2. To develop a system that will provide management with many items of information vital to business which are either inaccurate or nonexistent in a manual sales order processing system.

METHODOLOGY

Orders, inquiries, and requests for quotations are received from customers. Punched cards are prepared for each order, shipping notices, and small volume repeat order schedule dates. Inquiries would be sent to Production Planning to be expedited. Requests for quotations would be based on information obtained from Engineering, Finance, and Production. Quotations would be issued to the customer. Customer approved quotations would be handled like any other order.

1. Edit all transactions to insure correctness; read the order transaction cards and convert the cards to tape; print a listing at the same time showing those cards in error.
2. Sort the transaction file, since the order transactions are received in random order and since these transactions are to be used to update the customer master, which is in customer number sequence; sort the production schedule dates from Production Planning.
3. Update customer master file; process transactions against customer master to validate the orders and update the customer credit and order summary information, which is used to produce customer statements; print an order register showing all information concerning orders affected in the update and all new orders entered.
4. Separate the small volume repreat orders, which are sent to Production Planning, from the large volume orders, which are sent to Engineering.

5. Update the order file to delete those orders that have been filled and add the new orders which have been scheduled; print an invoice register which shows the orders for which invoices are to be issued and which is sent to accounts receivable. Invoice numbers are assigned, and the number of the next invoice is reentered into the next cycle via punched card.
6. Update the order information on the customer master file indicating those orders which have been shipped either completely or in part; print order acknowledgements and sent them to the customer acknowledging receipt of order, costs, and expected delivery dates.
7. Produce invoices sent to the customer requesting payment for those items shipped.

OBJECTIVES

1. To acknowledge orders sent by the customer
2. To quote delivery dates based on a production schedule.
3. to improve sales statistics
4. To update the accounts receivable ledger
5. To provide for inventory control.

PERSONAL OBJECTIVES

1. To improve and upgrade my knowledge in the field
2. To develop a system that will be a useful aid in teaching accounting, general business, and office practice
3. To make the students aware of the computer's ability to process, store and retrieve information in seconds of time; making it possible for the businessman to get the information he wants when he wants it
4. To develop a system that can be used along with other systems developed by students.

Title: A Computer Program to Process Football Scouting Data
Author: Fred Templin
Discipline: Physics, Coaching

PROBLEM STATEMENT

I would like to write a program on football scouting. The purpose of this would be to see what offense and what defenses would work best for our team against an opponent on any given Friday night or Saturday afternoon.

The way scouting is done at present is: for the coaches to go to as many games as possible that the opponents play prior to our game; to look at films of our games with this opponent of previous years; to look at films of games in which our opponent has played either this year or previous years; to look at films of games in which our opponent has played either this year or previous years with teams other than ours. We then take the information we obtain to try to see if the opponent has any tendencies, to see if they are a basic passing or running team, to see if they have any outstanding players or any weak players, etc. Knowing these things we try to set up the offensive plays that should work against their defense and set up the best defenses that will contain their offense. If a computer program could be set up, this information could be fed into the computer and produce a game plan faster, more accurate, and with less man hours than at present.

METHODOLOGY

Information we want on scouting reports:

Before Snap of Ball:

Formation used and defense against it.

Situation -- Present score, time in game, play and number of yards to go for 1st down or score.

Location -- On which and whose yardline the ball lies and if ball is on either hash mark (left of right) or in center of field.

After ball is snapped and play is carried out:

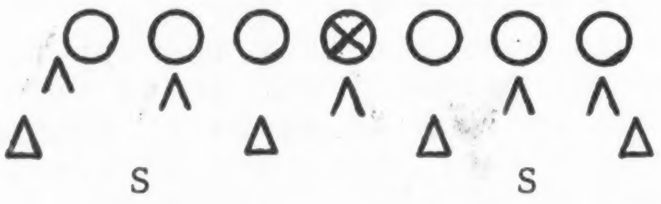
Yards gained or lost.

Pass, run or kick -- If pass: complete, incomplete, or intercepted; what receivers went downfield; type of pass (play action, drop back, roll out, sprint out, or halfback).

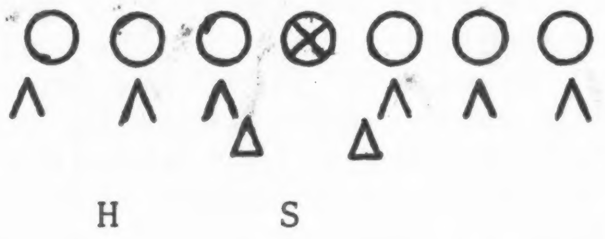
If run who carried, where through line was ball carried, type of play (dive, trap, counter, pitch out or triple option). If kick, who kicked, how far, could the ball have been blocked, where could a run back best succeed, how was kicking team's coverage on the receivers of the other team.

Λ -- Line men guards tackles ends
Δ -- Line backers
H -- Halfbacks
S -- Safetymen

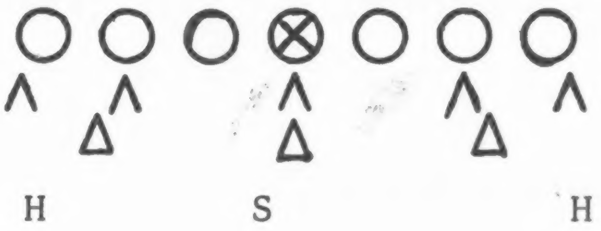
Basic Defense Formations



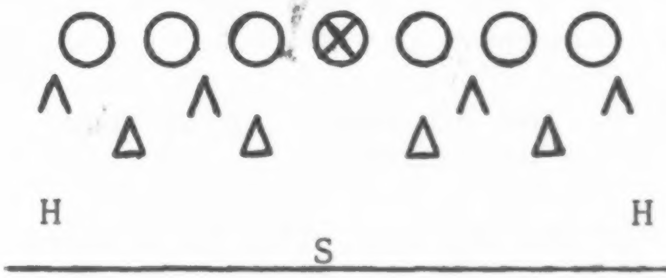
5-4-2 OKLA "ODD" Defense



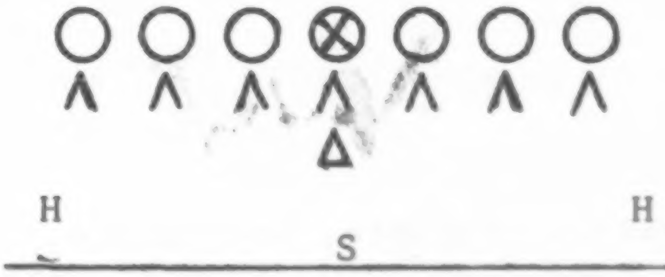
6-2-3 "EVEN" Defense



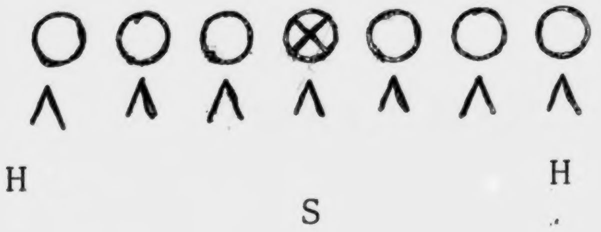
5-3-3



4-4-3

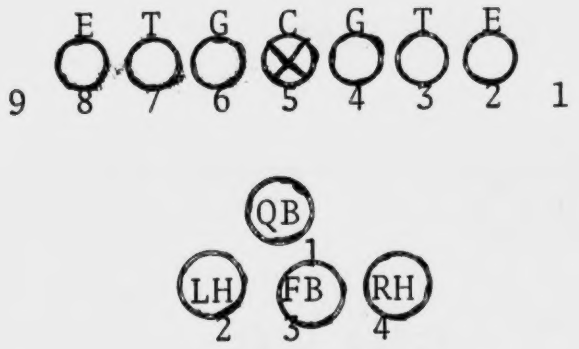


7-DIAMOND

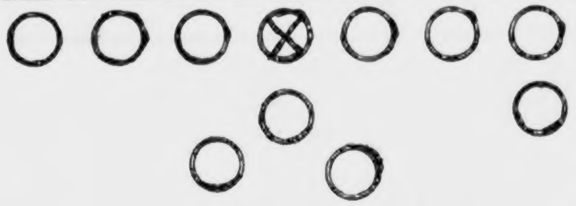


8-GAP

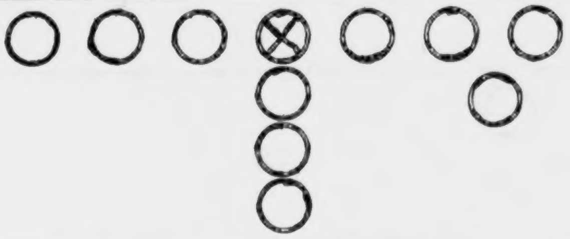
Formations and Offensive Positions


E T G C G T E
9 8 7 6 5 4 3 2 1
QB
1
LH
FB
RH
2 3 4

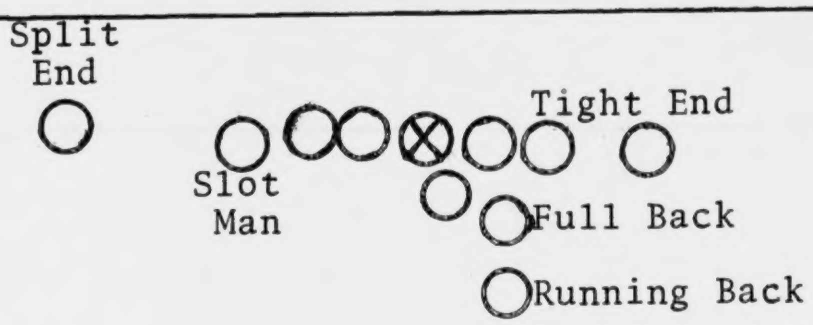
Full house
T Formation



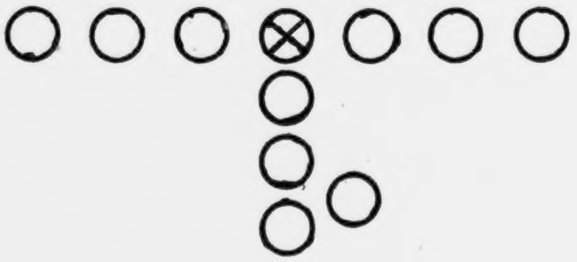
Wing T Formation



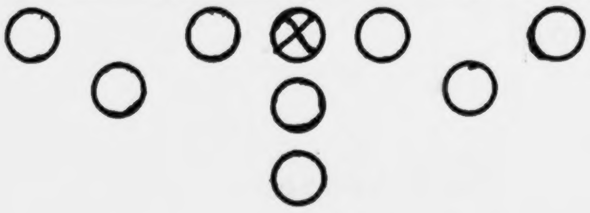
I East Formation


Split
End
Tight End
Slot
Man
Full Back
Running Back

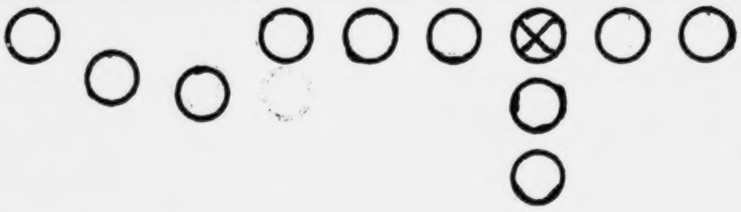
1 West Formation



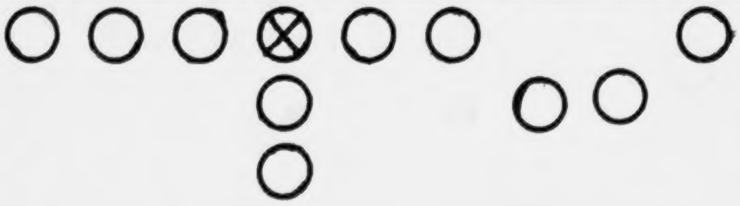
POWER I RIGHT



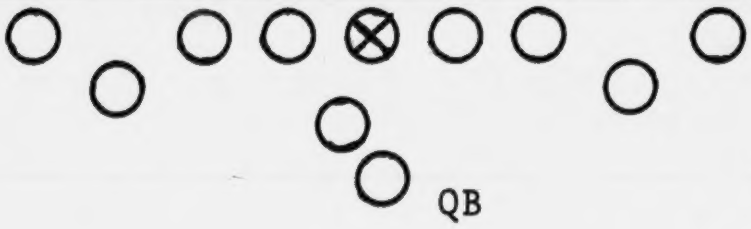
Double Slot



Trips Left



Trips Right



Shot Gun

Title: Systems for Studying Urban History
Author: Clement L. Valletta
Discipline: English

PROBLEM STATEMENT

The problem will be to present systems of social interaction for urban history. The variables are somewhat extensive and complex; however, it should be possible to design a system for the major factors which have determined urban choices such as building location and design, street building, parks, industry, jobs, strikes, purchasing, voting, demonstrations, entertainement, worship.

METHODOLOGY

A. Design of macrosystem with important factors to approach and handle data in balanced and inclusive way.
B. Use of this macrosystem, modified into relevant macro-systems to work specifically with selected aspects (building location, etc. as above) indicating just how the major factors were operative based upon study of source documents.
C. Relate each of these microsystems to one another to explain how and why choices were made.

OBJECTIVES

This project would present flowcharts of:

A. The macrosystem.
B. The microsystems including projected uses of source documents, computer processing, print-outs.
C. Microsystem interaction to explain workings of macrosystem for given aspect.

Title: A System to Individualize Bookkeeping Practice Sets
Author: Nell Vernarski
Discipline: Business Education

PROBLEM STATEMENT

To individualize a Bookkeeping Practice Set so that the final results of each problem will be different. Minor changes will be made in each set, for example, beginning balances of some accounts will be changed; amounts on transaction forms changed, or transactions eliminated entirely. As a result, every set, although basically the same, would have different totals, a different Profit & Loss, different Accounts Receivable or Accounts Payables Schedules, etc.

METHODOLOGY

A Master File will be developed. This file will include such information as the name of all accounts; the account numbers, the date and the balances of each account.

A Transaction File, a card file, will be used for each transaction. This file will include a Code number, the date of the transaction,the number of the transaction and the amount.

A code will be used in the program giving each different transaction a specific code number.

OBJECTIVES

To develop a printed Trial Balance, simplified Balance Sheet & Profit & Loss Statement for each Practice Set.

Title: Using the Computer as a Tool in the Industrial Arts
Metal Shop.
Author: Joseph C. Yuhas
Discipline: Industrial Arts

PROBLEM STATEMENT

Being in industrial art metal shop, I believe my problem should be one in which the computer is emphasized as a tool in metal working. Modern day manufacturers use the computer in the production of many metal parts. One such item shown in the text* I am presently using shows an assembly line run by a computer automatically machining various parts of the "Truck Engine Block" using numerical control tape and transfer machines to complete a finished product. A small part to be manufactured with several drilling operations in an X-Y grid will be presented.

METHODOLOGY

Show the part to be manufactured, using a paper tape with holes passing an electronic processing unit. This tape will start the drilling machine and select the positions of several different holes to be drilled by following an X-Y Traveler controlled by the paper tape. When all holes are drilled, the tape will signal a stop run.

OBJECTIVES

A small model may be built showing:

a. Tape Unit
b. CPU
c. X-Follower Shaft
d. Y-Follower Shaft
e. Drilling Head
f. Start Switches (Manual)
g. Stop Switches (Automatic)
h. Possible transfer units.

I plan to show drawings describing the operation of such a system, and perhaps build it in the future. I also believe by showing a punched paper tape running through a

*General Metals, John L. Ferier, McGraw-Hill 1968 reading station and operating an electric drill to produce a part will give the student in 9th and 10th grade metal shop a visual mock-up of a numerical controlled machine. Research for this project from:

1. Manufacturers of numerical controlled machines
2. Industrial Arts Magazines and Trade Papers.

APPENDIX H

EVALUATION OF THE EDITS CURRICULUM

Evolution of Data Processing

Content:

The development of data processing technology and its evolving relationship to the individual and to society was presented.

Objectives:

1. To provide the participant with background knowledge in the evolution of data processing.
2. To bring about an awareness of the tremendous impact which the computer has made on the individual and society.
3. To remove the stumbling block represented by terminology existing within the field.

Methodology:

To familiarize the participants with data processing concepts, an introductory comparison was made between the human memory and the computer. The diverse areas in which data processing finds application were presented.

In an evolutionary context, participants were made aware of the gradual growth of data processing from the time of Pascal, Lebnitz, Babbage and Hollerith, through the unit record era to the computer era of today. Lecture was supplemented with the films entitled "What Do You Want" and "Then and Now", both produced by Univac.

Distributed to the participants was the 'Buzzword Generator', through which an endless variety of technical terms can be generated. This served the purpose of removing the curtain of complexity surrounding the technological terminology existing in the field.

Also distributed at this time was the USA Standard Vocabulary for Information Processing,[1] and a 6 volume Programmed Instruction course on Computing System Fundamentals.[2] These were to serve as a supplement to

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[1] USA Standard Vocabulary for Information Processing distributed by Honeywell, Inc.

[2] Computing System Fundamentals, IBM DPD Education Development, Education Center, Endicott, New York, 1968.

Phase I of the Curriculum, which was the General Background of Data Processing.

To provide an early acquaintance of the hardware necessary in this field, a tour was made of a local computer installation. This served as a motivating factor for the course material to come. For the majority of participants this was their initial introduction to a computer.

Total class time spent on this unit was seven hours.

Conclusions:

1. Class lecture provided all participants with the evolutionary background of the computer and its associated field of data processing.
2. The various areas of application mentioned during the lecture served to familiarize the participant with the impact which the computer has made, and continues to make, on society.
3. Materials distributed provided the student with confidence in using data processing terminology.
4. Level of Objectives Attained. A high level of all objectives at this point was accomplished.

Problem Areas.

None

Recommendations.

It was generally agreed that the time spent on the lecture period in this evolutionary era be drastically reduced. One alternative would be to reduce by one-half the unit time of seven hours, or to supplant the lecture with additional films and/or field trips.

Data Representation and Data Management

Content:

Available methods for handling data via the computer were described.

Objectives:

1. To acquaint the participant with the concept of number systems.

2. To acquaint the participant with the concepts of computer files and the management of these files.

Methodology:

A combination lecture and laboratory approach was used in presenting this study area. Time allotted to this unit was 7 hours.

The various number systems were presented: binary, decimal, octal and hexadecimal. Examples were employed to demonstrate each system, after which laboratory exercises afforded participants the opportunity to test their abilities in manipulating these number systems.

The Hollerith Card code in use was explained. A punched card containing the entire character set was distributed to all participants. This visual aid allowed for easier presentation and an in-depth understanding. Also discussed were the various binary coded systems: BCD, EBCDIC and USACII.

Lecture, supplemented by class exercises and transparancies, was the means utilized to present to the participants the concepts of data structure, media, arrangement and organization. Concepts of file management were discussed in depth. Numbering systems exercises were distributed.

Conclusions:

1. Laboratory exercises fully served their purpose in developing participants abilities in manipulating number systems.

2. By means of lecture and transparancies, participants were made aware of the concepts of data files, their manipulation and management.

Problem Areas:

The concepts of data organization on disk and offline storage proved to be difficult to grasp by many participants. Though a problem, it was felt that this material would be reinforced by presentation in the two study units to follow.

Recommendations:

The laboratory exercises were most useful in helping the participants feel comfortable with the material being presented.

Concepts of Data Processing Hardware

Content:

The various components of the central processing unit were described, together with its peripheral, supportive and communication devices.

Objectives:

1. To familiarize the participant with the hardware aspects of data processing.

2. To provide a description of each piece of hardware with regard to its function and purpose.

Methodology:

Essentially a lecture approach was used to present this study unit. Total time entailed in presentation was seven hours.

The various peripheral devices were presented initially, followed by an in-depth description of the components of the central processing unit, together with their purposes and major functions. The supportive and communication devices were then described to present a total hardware concept. Transparancies were used to supplement lecture.

During the course of presentation, reference was made to hardware sections and illustrations contained in the Programmed Instructional series on Computing System Fundamentals which were distributed to the participants earlier in the course. These provided excellent supplementary reading and exercises on hardware concepts.

Conclusions.

1. Participants, availed to an earlier tour of a computer installation, were now more familiarized with the various functional devices which make up hardware.
2. The inner make up of the hardware devices were no longer mysterious but functional and purposeful.
3. Though extremely complex technological concepts were presented here, a sufficient level of understanding was grasped.

Problem Areas.

One very major problem area existing within this unit is the extreme difficulty incurred in grasping the concept of core storage. For many participants this concept presents a major stumbling block. The difficulty is further compounded by the fact that models of core are not readily available.

Recommendations.

It is felt that another field trip tour during or following this unit would serve for more pronounced association of theory with physical hardware.

Highly recommended is the procuring of models of core storage and the use of many functional visuals.

Concepts of Data Processing Software

Content:

The concept of the stored program and its components is presented, followed by a survey of the present types of programming languages. Attaining this background, the participant is lead to the concept of individual program development and finally to an awareness of the various utility programs available for the repetitive type of programming functions. The individual programming effort is then meshed with the concept of operating systems to present a total concept of the software system. Finally, the concept of application package availability is presented.

Objectives.

1. To impress upon the participant the importance of software computer technology.
2. To familiarize him with the terminology and the uses of various types of software.
3. To bring about an awareness of the evolution, development and need of software standardization.

Methodology:

A total of fourteen hours was devoted to this study area, two of which were used in touring a local computer installation. The tour served two purposes:

1. participants were able to observe "theory put into practice."
2. concepts in both software and hardware were reinforced.

Class lecture closely followed the curriculum as outlined, with emphasis placed on the concepts of the stored program, types and evolution of programming languages, program techniques, and operating systems.

During the course of the tour, demonstration of various types of program runs including compilations, assemblies, program dumps, etc. provided immediate observation of software utilization.

Conclusions:

1. The participant realized that the essence of present day computer technology is due not only to hardware per se, but to the union of hardware with software. The insufficiency of one without the other was now clear.

During the course of presentation, reference was made to hardware sections and illustrations contained in the Programmed Instructional series on Computing System Fundamentals which were distributed to the participants earlier in the course. These provided excellent supplementary reading and exercises on hardware concepts.

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Conclusions:

1. The participant realized that the essence of present day computer technology is due not only to hardware per se, but to the union of hardware with software. The insufficiency of one without the other was now clear.

2. Throughout this entire study area, participants were familiarized with software terminology and the various uses of software.

3. An awareness of the evolution of software was attained during classroom lecture. During presentation of the various types of software, the participant gained insight into the need for software standardization. This insight was to be further expanded on during the course of the COBOL study area.

4. In general, it was found that the level of objectives attained in this area was directly dependent upon the ability of the participant.

Problem Areas.

Various problems did exist in this unit. The major problem was the inability of some to grasp the content of data storage and manipulation within the computer. Primarily the problem seemed to arise from a lack of perception coupled with the lack of adequate audio-visuals. On the whole, available films pertaining to this area were unacceptable due to the fact that the majority of films concentrate on details of a particular language rather than on concepts in general. Models too, were either inadequate, expensive, or not feasible. As a result, the instructors were forced to rely chiefly on the chalkboard, transparencies and installation field trips.

Recommendations.

Since the concepts of the stored program and operating systems are quite difficult for some students to grasp, it is strongly recommended that many transparencies be used and applicable models be developed.

The time period used for this unit was geared to the average and above average participant and consequently would require extension should the average group level be low.

The ideal physical environment for teaching of this unit is within immediate access of a computer installation.

Computer Processing Techniques

Content.

The application and attributes of the four methods of present day information processing techniques were presented in an evolutionary context.

Objectives.

1. To acquaint the student with the manner in which a computer may be utilized.
2. To familiarize the students with the various facets of computer utilization.

Methodology.

A total of seven hours of lecture was required in this study area. The four techniques were presented in the following order: batch processing, multiprogramming, real-time processing and time-sharing. The basic attributes and applications of each were described in terms of hardware components already studied. Emphasis was placed on the evolution of those techniques which unfolded as the natural result of hardware development. An excellent example of batch processing was provided during the computer installation tour made in the previous study unit.

Along with lecture, a film on IBM's 360 operating system was used to illustrate the concept of multiprogramming.

Due to the unavailability of real-time and time-sharing facilities at this time, (a real-time information retrieval field trip and a CAI demonstration were arranged at a later date), chalkboard and transparencies were employed in order to assist lecture in these techniques.

The basic approach used in this unit was the simplification of highly technical details to provide a basic level of learning. The concept of each technique was given clarity without causing the participant to become overwhelmed with technical matter.

Conclusions.

1. The participant now realized the various means in which a computer may be utilized.
2. Participants were made aware of the fact that various computer applications adapt themselves only to a particular type of processing.
3. In this study unit a fairly high level of understanding was attained well within the participants level of ability.

Problem Areas.

Though not a problem, the lack of real-time and/or time sharing facilities might be deemed an inadequacy within this study area.

Recommendations.

No recommendation for time expansion on this area can be made; seven hours was found to be quite sufficient for the level of technical detail desired. To produce the highest level of interest and motivation, it is recommended that all efforts be made in providing installation tours such that all four processing techniques may be observed.

Decision Making Techniques

Content.

The purpose, logic, and use of the visual techniques of flow charting and decision tables in problem description and documentation were presented to the participants.

Objectives.

1. To familiarize the participant with visual problem solving techniques used within the field of data processing.
2. Through the use of these techniques, to develop within each participant the logical thought processes necessary to problem solving.

Methodology.

The purpose and use of decision making techniques was explored. Initially the technique of flow charting was introduced. The systems, procedure, and method flow chart together with the block diagram, were presented. The distinction between each type of chart was explained, as were the symbols pertinent to each. Flowcharting templates were then distributed to each participant.

To quickly and basically acquaint the participant with the detailed logic of flowcharting in relation to problem solving, a film was shown depicting the simple situation of a child getting off to school. The flowchart of the logic of the situation was overlaid on the film, thus the participant attained a visual representation of the situation coupled with the associated logic charting symbols. This quick and basic approach was further strengthened with the distribution of material on a second situation which provided instruction and motivation by means of its simple, yet amusing, nature.

Participants spent approximately two hours of laboratory time developing their skills and logic in flowcharting problem situations. A total of three increasingly difficult problem situations were distributed to all participants. At the conclusion of each, the various approaches to the solutions were discussed by the group.

The technique of applying decision tables to problem solving was then presented. Here participants were informed of the types of decision tables in use, the components of such tables and the manner in which decision tables are used. Examples were employed to illustrate the application of this problem solving technique. During a one-hour laboratory session, participants formulated their skill in application of decision table techniques within a total of two problem areas, which was followed by class discussion.

In all, a total of seven hours was used in this study area, three of which were devoted entirely to laboratory sessions.

Conclusions.

1. Participants, now aware of completely new techniques applicable to problem solving, are able to apply these techniques not only to problem solution in the

area of data processing, but also to problems within their own discipline.

2. Participants developed the basis of a logical detailed thought process which is now capable of being expanded through increased application.

3. A sufficient level of comprehension was attained within this study area. Due to the relative unfamiliarity of these techniques, and the fact that the majority of individuals do not generally engage in detailed thought processes, the level of thought development attained was adequate at this point in the course.

Problem areas.

Although participants at this point in the course attained the adequate understanding of the detailed thought process, the process as yet had not come "naturally". This ability can be brought about, therefore, only through much application and practice. In retrospect, following course conclusion, it was felt that this was a problem area in the course. It is firmly believed, that at this point, it is best to remain within the study area until the average participant is quite agile at employing the techniques of flow charting.

Recommendations.

It is strongly recommended that the time period devoted to this study unit be expanded, especially in the laboratory area, and that many additional laboratory problems be employed.

COBOL Programming

Content.

An extensive study of the COBOL language, together with exercises in the use of the language, is presented.

Objectives.

1. To provide the participant with experience in the use of the problem-oriented programming language of COBOL.

2. To provide the participant with "hands on" experience in programming, and

3. To further develop within the participant the detail thought process initiated in the previous study unit.

4. To allow the participant to appreciate the detail necessary to develop an efficient system.

Methodology.

A combination lecture-laboratory approach was used in this study area to provide in each participant a thorough knowledge of, and ability in, COBOL.

Initially, the general characteristics of the COBOL language were presented. A simple COBOL program was distributed and explained to the participants in order to familiarize them them with the language and its format. This program served as major reference material throughout this study unit.

All four divisions of COBOL were described with laboratory exercises accompanying each. During the fourth division, the Procedure Division, participants began coding complete COBOL programs which provided them with "hands on" experience in programming. The initial program coded was simple but interesting thus providing much motivation. The problem called for determining the present day value of the twenty-four dollars paid for the island of Manhattan in 1627, compounded at the interest rate of 3%. Participants were required, as a group, to develop the flow chart, and individually code, run, and debug the program. Due to this "hands on" experience, motivation and interest were extremely high.

Upon conclusion of this program, participants were presented a second problem: that of a customer file conversion. Whereas the initial program required no input and only printed output, this problem was of a more difficult level, requiring card input and tape and printer output. The same procedure was followed with the participants as in the initial problem, that is, participants as a group were required to flow chart the problem, and individually code, run and debug the program. Again, all participants were provided with "hands on" experience at the computer center. Motivation and interest remained at a high level.

The third and final problem presented was that of computation of F.I.C.A. This problem was slightly more difficult, yet required fewer I/O devices. Here, it was required that flow charting of this problem be done on an individual basis, as was the coding. However, the running and debugging of this program was optional and was done on a remote basis. This option provided the more capable student with additional enrichment.

In order to assure as much individual attention as possible, two additional system analysts were brought into the classroom as aides.

The time spent within this study area was a total of 45.5 hours.

Conclusions.

1. Within the framework of the lectures and laboratory exercises, participants were experiencing the use of the problem-oriented language, COBOL.

2. "Hands on" experience was provided with the actual flow charting, coding and debugging of each total program presented.

3. The required initial flow charting of each problem, together with the actual programming, developed the detailed thought process required.

4. The level of ability attained in this study unit was directly proportional to the level of detailed logic ability present in the participant.

Though not required, the Programmers Aptitude Test (PAT) was given those who desired to take the test. On the whole, those participants who took the PAT test, and scored well on PAT, accomplished a high level of understanding in this area.

Problem Areas.

The only problem area existing was that of the participant lacking in programming aptitude. The sessions were geared to the average level of the participants. The participant of low ability, of course, required the greatest amount of individual attention.

Recommendations.

It is recommended that the time devoted to this study unit be increased by a minimum of 15 class hours. This time expansion, it is felt, would be sufficient for the slow participant, while at the same time additional, more difficult exercises could be provided for the average and above average participant.

Recommended also, is the technique of employing additional systems analysts to provide more individualized attention in the classroom. This technique is extremely effective, and consequently should be utilized.

Data Processing Systems and Procedures Concepts

Content.

A study is made of the methods and techniques employed in utilizing the computer as an organizational tool.

Objectives.

1. To provide the student with a comprehensive view of the many phases of data processing systems planning,
2. To show the participant that programming is but a portion of the whole of data processing ,
3. To produce in the participant an awareness of the imagination and creativity needed to bring about operational improvements.

Methodology:

A total of 17.5 class hours was devoted to this study area, approximately 16 of which were devoted to lecture. Emphasis was placed on lecture.

The four major phases of analysis, design, implementation and finalization involved in systems planning were presented in an evolutionary manner. Stressed, was the fact that systems analysis begins with a problem. Through verbal examples, participants were made aware of the fact that oftentimes the problem is not as it appears on the surface, but rather can only be detected by thorough "detective work" i.e., fact gathering. The importance of studying the existing system was emphasized to the participants.

The approach used here was essentially that of lecture supplemented with a simple system used as a laboratory exercise. This exercise was used to illustrate examples of emphatic points brought out in the design phase of systems planning. Considerations made in the design phase were those of general and detail system design, I/O design, file, record and forms design, controls and exceptions handling, to name but a few.

Phases and factors to be considered in the implementation and finalization stages were emphasized.

Conclusions.

1. Each participant received a total view of the many phases existing in systems planning.
2. By observing the total planning involved in systems, each participant was made aware of the portion of the total in which programming is involved.
3. Through the various examples used in the lecture, it was made clear that creativity is a necessary ingredient of systems planning.
4. The level of understanding reached in this area was considered adequate in view of the fact that no direct application was yet made by the participant.

Problem Areas.

It is felt that additional laboratory applications should be closely correlated with the lecture.

Recommendations.

It is very strongly recommended that a total complex system be used in conjunction with and in close correlation to, the lecture. In addition, the time spent on this unit should consist of a minimum of 21 class hours, no less than six of which should be devoted to laboratory exercise. Emphasis must be placed on the participant's application of lecture material for maximum effectiveness.

Integration of Systems and Programming

Content.

A general interest case study, that of a system of voter registration, was presented with the purpose of integrating the relationships between systems and programming.

Objective.

1. To enable the participant to apply the theory obtained in systems planning.
2. To integrate his knowledge gained in systems and in programming in order to effectively develop a workable system.

Methodology.

In presenting this case study, the general approach used was that of combining lecture, group discussion, and most importantly, laboratory application.

The voter registration system presented was chosen because of its interest to the class on a whole. Though presented in case study form, participants were to develop a more feasible system of voter registration. Given to each participant were details on the system consisting of: hardware configuration, background information and specifications relating to the registration and voting process. Also included was the definition of terms to be used in discussing political areas encompassed by the voting system.

The basic approach began with designing the master file required by the system. Following the Master File design, a discussion was held regarding the total voter system. To enable the design phase of the total system to be more manageable, the application was divided into three phases or smaller systems: pre-election, election, and post-election processing. By utilizing group effort, various general system designs of each processing phase were developed. Following class discussion the most feasible design was selected by the group.

After the general design was completed,the participants developed the detail design to be utilized in each processing phase. Included in detail designs were such considerations as design of I/O files, defining system controls, design of various forms such as street lists, voter certificates, purge notices, retention lists, etc.

Twenty-one hours were devoted to this particular study unit.

Conclusions.

1. Participants, through discussion and application, utilized systems theory acquired.

2. Each participant, by developing a workable system, integrated the relationship which exists between systems and programming.

Study plans for this area called for the system being studied in total. The method employed consisted of following a general system design of all phases. However, this method did not prove to be the most effective. It was too much material for initial consideration by a novice.

Recommendations.

It is strongly recommended at this point in the curriculum, that a system be presented in phases; that is, consideration of general and detail design of each phase should be made prior to any development of the next phase. The total system will then evolve.

Also recommended is the expansion of the time spent within this study area.

Practical Applications in Industry

Content.

Case studies of data processing applications used within industry were presented. Case study applications developed were those of Sales Statistics, Inventory Control, and Payroll. In addition, various common and uncommon applications were discussed.

Objectives.

1. To develop within the participants a broad realization of the capabilities and functions of data processing in industry.
2. To further enhance the participants ability to develop workable systems.

Methodology.

A total of 10.5 hours was spent on this complete study area. Thus approximately 3.5 hours was spent on each case study. The case studies presented in order of their occurrence were the applications of Sales Statistics, Inventory Control and Payroll.

The general approach used in presenting each case study was to provide both general and specific facts on the given application. In all three case studies, the output reports desired by the application were presented to the participants.

Having been given the facts on a particular organization and the ability to derive from the output reports distributed, that data required by the management of a particular organization, participants were given the task of developing a feasible system. As various approaches were developed, discussion was employed to establish the feasibility of each.

In addition to developing a workable system, participants were required to develop designs for files and forms utilized by the system. Discussion was held as to the requirements of the programs utilized and, where time allowed, participants were required to develop detail program flow charts.

Transparencies of workable systems were employed. Participants were provided with both the output reports required by each application and with a final workable system flow chart.

To further provide participants with the realization of the diversified data processing applications currently in use, a tour of a local medical insurance installation was made. Here, participants viewed a complete billing system in operation. The various processes within the system were thoroughly explained. Participants now observed not only the relationships existing within systems and programming, but also the integration of the hardware to the system.

Following the case studies, additional applications were discussed. Emphasis was placed on data processing applications in industry which are not commonly known, such as application within the areas of publishing, manufacturing, and trucking services.

Conclusions.

1. Participants were made aware of the numerous applications within industry in which data processing can be utilized.
2. Each case study served to further develop the participants ability and capability of developing workable systems.
3. The three case studies presented served to both develop and reinforce the participants ability and creativity in developing workable systems. Thus, the level of understanding attained increased with each case study presented.

Problem Areas.

Essentially there were no major problem areas existing within this study area.

Conclusions.

Time allotted to this area was adequate. By means of exposure to several systems, participants developed the confidence and ability required in systems planning.

Practical Applications in School Administration

Content.

Presented within this study area were case studies of data processing applications used within school administration.

Objectives.

1. To provide for the educator-participant an insight into the various areas within school administration in which data processing can be applied.
2. To develop, to a more extensive degree, the participants capability with system design.

Methodology.

Approximately 3.5 hours was spent on each of the three case studies presented, thus a total of 10.5 hours was devoted to this study area. In order of their occurrence, the case studies presented were those of: Attendance Accounting, Grade Reporting and School District Census.

The same approach was used here as in the area of Practical Applications in Industry. Within each case study, participants were presented with general and specific facts on the given application. Output reports for the application were supplied to all participants. Again, having gathered the facts on a particular application and deriving from the output report the data required by the school administration, participants developed a workable system for each application.

Design of the system included both the general system design and the design of all files and reports and reports required within the system. Program design was accomplished either through class discussion or actual program flowcharting, depending on the application presented and the time involved.

Visuals of a workable system and of output reports required were shown to the participants. Materials duplicating the visuals were distributed to each participant.

To supplement the case study on Grade Reporting one participant explained the automated system of grade reporting used within his school district. Mark-sense grade cards and report card forms used in this system were brought in for each participant. This stimulated interest among the participants on the various systems in use.

To conclude this study area, reference was made to an excellent article entitled "100 Uses for School Processing".

Also discussed in greater detail, were applications pertinent to school personnel profiles, analysis of school attendance areas, school facility planning and expansion, library acquisition and cataloging, registration and class scheduling, and student transportation.

Conclusions.

1. Participants gleaned a broad spectrum of the many areas within school administration in which data processing can be applied .
2. The capability for systems design was greatly extended by the application of each case study.
3. It was observed that the level of understanding within this study area continued to increase with each application presented.

Problem Areas.

No major problem existed within this study unit.

Recommendations.

Adequate time was spent on this area. The presentation of several small but complete systems provided a continued means of reinforcement of the techniques used in system development.

Advanced Class Problem

Content.

A problem was presented which required the extension of the previously studied system of Grade Reporting.

Objectives.

1. To enable the participant to apply his acquired knowledge in systems to a realistic situation.
2. To develop and elaborate upon an existing system to specify the details of that system.
3. To further emphasize the relationship of systems and programming.
4. To enable each participant to realistically apply the four phases of systems study: analysis, design, implementation and finalization.

Methodology.

The previously undertaken system of Grade Reporting was expanded to include additional output reports and to accomodate a district rather than just a school. Thus the existing design originally used for the Grade Reporting System was no longer feasible.

The problem presented was realistic in that all participants were quite familiar with their own system of grade reporting. Further, the expansion of an existing system is quite a common problem in data processing.

An attempt was made toward employing realism in the approach used in presenting this study unit. As a result, participants were divided into groups of three, each group representing a study team of system analysts. It was the responsibility of each group to cover the analysis, design and implementation phases of the system. Each group was also responsible for developing both the general system and the details of that system.

Material denoting the general and specific facts of the existing system was provided. Participants were to develop the expanded system only after close analysis of the existing system. This analysis entailed studying all materials and data previously distributed in the system in order to effectively design a more efficient system.

Following the development of any phase of the system by any one group, that group, represented by a lead system analyst, presented its design to management for approval and/or constructive criticism. Management was represented by the course instructors and the remaining groups of participants. This technique, in addition to allowing the realistic application of systems knowledge, provided an atmosphere of challenge and competition, thus providing a high degree of motivation. This same technique was used for all phases of the system design.

To carry out the implementation phase of systems work, each group was required to code and debug one of the programs required by the system. This coding requirement enabled each participant to call upon the programming knowledge acquired earlier in the course.

The system was finalized by requiring each individual to document the system designed by his group. This documentation process entailed providing complete system description in regard to: general flow, hardware requirements, processing intervals, statistics on the physical system, description of file creation and maintenance, handling of exceptions, controls required, narratives on each program utilized by the system, and recommendations for future utilization of the system. In addition, participants were to provide with the documentation a general systems flow chart, a detailed program flow chart of the specific program utilized and layouts of all files and report designs.

The total number of hours spent in this area varied with the group. The EDITS participants completing the course without a summer recess completed the study area in 21.0 hours. The second group of EDITS participants, (those who took the summer recess and returned in the fall) required 31.5 hours. The time differential was attributed solely to the two-month summer break. It was quite evident that the COBOL programming required in this study area was more immediate in the minds of the summer group, as less time was spent on implementation.

A team teaching effort was used throughout this study area, but especially during the phases of implementation and documentation. This technique provided much needed individual attention. It might be noted that this was the first complete system in which participants carried out all phases of systems work. In addition, the complete responsibility for the development of a feasible system was on the participants.

In this study unit, the opaque projector contributed greatly to the effectiveness of participant presentations. Since each group of participants was required to present to the entire class their developed designs, much time was saved by projecting these designs immediately without having to transfer them to the chalkboard.

Conclusions.

1. The participant was able not only to apply his acquired systems knowledge to a realistic situation but was also able to enact the role of the systems analyst.

2. Due to the constructive criticisms offered by competing groups of participants, each group developed a possible system of grade reporting and, in addition, was able to specify all details of the system.

3. By carrying a complete system application through all of its phases of analysis, design, implementation and finalization, the relationships existing between systems and programming were quite evident to each participant.

4. All phases of systems were applied not only to a realistic situation but also to a situation with which each participant was quite familiar. This experience proved to be an aid to participants during their final individual project at the conclusion of the course.

5. Each participant left this study unit with a feeling of accomplishment and the attainment of a higher level of understanding.

Problem Areas.

Problems existing were twofold: participants, were essentially nontechnical and unfamiliar with complete technical documentation, and so proceeded very slowly in this area. The second major problem was the summer recess in the course schedule, resulting in a loss of retention on the subject matter previously acquired. This loss resulted in requiring that more time be spent on this unit than had been allocated.

Recommendations.

It is highly recommended that the total course be established so that no recess of any substantial length would occur throughout its entirety.

Also recommended is the proliferous use of examples of technical documentation either in the form of reference material or in the form of specific examples on transparencies.

Information Retrieval

Content.

The concepts and techniques utilized in storing and retrieving data were presented. The existing types of retrieval system, data-base, reference and data-processing were discussed. Included were the concepts of management information systems and their design problems.

Objectives.

1. To familiarize the student with the concepts and techniques of Information Retrieval.
2. To produce in each participant an awareness of the ever-increasing need of such systems.
3. To emphasize the applicability of information retrieval to all disciplines.

Methodology.

A total of seven hours was spent in this study area. The approach used was chiefly that of lecture and demonstration. To introduce this topic area, a tour was made of a local stock brokerage firm. Here, participants were informed of a major international information retrieval system which is in use by the firm. Judging from the participants questions during the demonstration, much information was acquired.

An evolutionary approach was taken in the class lecture on information retrieval. Presented were such items as the definition of information retrieval systems, their need, the early conceptions of such systems and the technological milestones leading to the growth of these systems.

Data-based, reference, and text processing systems were discussed with emphasis placed on their organization, function and application.

Emphasized was the fact that the various systems which had been employed during the course were examples of data base systems. Discussion was devoted to the concepts and inherent design problems of Management Information Systems, a prime example of data base systems.

It was pointed out that of the three types of IR systems in use, the text-processing system is in the lowest stage of development. Since the objective of the text-processing system is man-machine conversation in the English language, it was required that specific programs be written to accomplish this fact. Examples of these languages were provided for the participants.

In an effort to elaborate on the efficiency of indexing required in the reference type of retrieval system, participants toured the InTech library, where they were shown examples of indexed reference systems such as KWIC (IBM's Key Word in Context system) and Eric.

An excellent film on Information Retrieval developed by IBM was shown to the summer session of EDITS. This film, unfortunately, was later withdrawn from circulation, consequently the fall session of EDITS was unable to view the film.

Copies of There's a Computer in Your Future[1], were distributed to participants in preparation for the unit to follow in computerized instruction. This booklet contains a wealth of material on computerized instruction.

The essential visuals employed were transparencies and the chalkboard.

Conclusions.

1. By means of lecture and demonstration, participants were familiarized with the concepts and techniques of Information Retrieval.

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[1] "There's a Computer in Your Future," reprinted from American Education, United States Department of Health, Education and Welfare, Office of Education, November, 1967.

2. Emphasis was placed on the abounding growth of information produced daily in today's world thereby informing participants of the highly relevant need for such systems.

3. Emphasis was placed on the applicability of IR systems to all disciplines.

4. An adequate understanding and awareness of the concepts of information storage and retrieval was attained.

Problem Areas.

This study unit presented several problem areas, the most major of which was the relative lack of laboratory application. This was caused by two factors: (1) available material on information retrieval was of a highly technical level and thus unsuited for the course, and (2) the time allotted to this unit was such that any good laboratory application which could be brought down to a basic level would have exceeded the time allowed.

The unavailability of good audio/visuals relevent to this area presented another major problem.

Recommendations.

It is highly recommended that applications be presented in a technical but basic manner. Laboratory application is needed for maximum effectiveness.

Concepts of Computer-Assisted Instruction (CAI) and Computer-Managed Instruction (CMI)

Content.

This study area consisted of a discussion on computers and their role in the educational process.

Objective.

To acquaint the educator-participant with the potential of the computer as an educational tool.

Methodology.

The basic approach used within this study area was that of lecture, discussion, and laboratory exercise.

The background and development of the computer in relation to education was provided. The differentiation between computer-assisted instruction and computer-managed instruction was also made and examples of each were provided.

Both the instructional and the administration applications of each were discussed.

Hardware components required for educational computer systems were covered in detail, and various configurations of existing CAI and CMI systems were presented. Realistic cost comparisons both present and projected, among the CAI and CMI systems were made available to the participants.

The software requirements for these systems were also discussed and participants were made aware of the ever increasing availability of the number of the so-called author languages available for CAI systems. Coded samples of the author languages LYRIC and PLATO were described to the group. In addition, participants were required to develop a CAI curriculum applicable to their own discipline, using the author language PLANIT.

Other topics included in this study area were: advantages, problems, present day projects in, and evaluation of computerized instruction, and curriculum sources.

Many transparencies were used to supplement the lecture. In addition, an excellent film entitled Sign On/Sign Off[1] was viewed by the participants.

A major vendor was contacted and a CAI demonstration via a portable teletypewriter was set up. Participants viewed a CAI film and enjoyed an informative lecture. Excellent materials on computerized instruction containing several sample CAI programs were distributed to all participants. Technical difficulties unfortunately, prohibited a complete demonstration.

A total of 10.5 hours was devoted to this study area.

Conclusions.

1. All participants gained insight as to the tremendous potential existing with the application of the computer to the educational situation.

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[1] Sign On/Sign Off, produced by The Pennsylvania State University.

2. Not only was a high level of understanding gained in this area, but participants were exceptionally motivated and displayed an unusual amount of interest.

Problem Areas.

No real problem occurred in this study unit.

Recommendations.

Time allotted to this area was adequate, however several CAI demonstrations and/or tours would no doubt increase the effectiveness of this unit. One of the considerations recommended is the provision of a guest lecturer who is involved in an actual CAI setup. It is felt that maximum effectiveness could be incurred by having the participants tour an educational institution on which computerized instruction is operational.

This study area was found to be of high interest and motivation to educator-participants.

Selection of a Computer

Content.

Important facts to be considered in the selection of a data processing system were presented.

Objectives.

1. To acquaint the participant with facts to be considered in the evaluation of a computer.
2. To provide a guide for evaluating vendor-submitted proposals.
3. To familiarize the participants with the options available to him in selection of a computer.

Methodology.

Lecture was the chief means of achieving the objectives desired. A laboratory exercise was provided at the conclusion of the unit to measure the level of understanding attained by each participant. A total of 10.5 hours, including laboratory application, was devoted here.

All important facts to be considered and guides to be followed in the selection process were provided to the participants. Elements to be considered in the selection process were comparisons in: central processors, peripheral devices, software, future expansion possibilities, service, system and educational support and installation factors.

Various comparative rating techniques used in evaluating the above elements were discussed. The various contract options available and the purchase/lease considerations were discussed in depth. The pros and cons evolving from the unbundling policy now undertaken by major vendors were presented as factors affecting future purchase and lease policy.

Transparencies were freely employed to emphasize comparisons in the attributes of hardware components.

Three sample vendor proposals were presented to each participant for evaluation and selection of proposed hardware for application in a school situation. Participants were required to evaluate each proposal using one of the several rating methods presented during the unit. Following their selection of equipment, the participants were to provide written documentation with specific reasons justifying their choice. In addition, the reasons for disqualifying the remaining vendors were also required.

Conclusion.

1. By evaluating the written documentation produced by each participant, it was established that a high degree of understanding and applicability was procured within this unit.

Problem Areas.

No major problem areas existed in this unit.

Recommendations.

The time spent on this study area was adequate.

Distributing various vendor proposals and requiring participants to select the most appropriate proved to be an extremely effective tool and can be highly recommended.

Consideration should be given to obtaining a guest lecturer preferably from an organization which is in the process of, or which has just completed selection of a computer. Discussion of the guidelines used in the organization's selection process should prove highly interesting and effective to the group.

Data Processing Teaching Aids

Content.

The various aids available for instruction in data processing were presented.

Objectives.

1. To review with the participants the various teaching aids that may be utilized in data processing instruction.
2. To make available to the participants the information sources for data processing materials.

Methodology.

Two approaches were used in this study area. Each is described below.

A total of 3.5 hours was involved. Class consisted of lecture, discussion and a field trip in which computerized games were demonstrated. The various teaching aids that may be utilized in data processing instruction were discussed. As each type of aid was brought up in discussion, material pertaining to its source was distributed. Information sources were provided on films, slides, manufacturers, reference information, technical societies, journals and magazines.

Participants had been introduced to the various aids throughout the course thus a review and discussion of all available aids proved sufficient to familiarize participants.

Extensive printed information on sources of data processing and educational materials, societies and journals was distributed to each participant.

Conclusions.

A satisfactory level of review was accomplished. Concrete informational sources were now in the hands of the participants.

Problem Areas.

None

Recommendations.

It is recommended that computerized decision-making games be used in this area when available. Another consideration to be made: the design and development of various data processing models.

Current Applications in Education

Content.

Various applications of computer technology in education were presented for review and discussion.

Objectives.

1. To provide an awareness in the participant of the broad spectrum of areas in education in which computer technology is being applied.
2. To stimulate research into current educational applications in preparation for the participants individual problem which will follow this study unit.
3. To instill in each participant the proper motivational stimulus necessary for the great effort about to be undertaken in the final individual problem.

Methodology.

Two methods of approach were utilized in this study area.

In the first group, which was comprised of the summer participants, 7 hours was devoted. Lecture was used to inform participants of the abundance of educational areas presently employing computer technology. There followed an open discussion on the matter.

With the second group, a substantially different approach was taken. Prior to undertaking this unit, participants were requested to research articles pertaining to current applications in education. To accomodate participants who had no immediate access to technical material, data processing journals and magazines were brought into the classroom.

In this way, all participants were able to engage in research. During the actual coverage of this area, participants were well prepared with discussions on the various uses of the computer in education. In addition, interest had been stimulated to a high degree.

Approximately 2.5 hours was entailed in discussion, however, additional time could well have been used for an extended discussion period.

To stimulate the participants in regard to the climatic point of the course, (their individual problem) a member of the summer group addressed the class. The summer EDITS participant who had completed the course in September spoke to the class concerning her completed individual problem which had been a CAI system for teaching Music Theory.

The presentation was excellent and her enthusiasm was contagious in that it instilled the proper motivational spirit into the group.

Conclusions.

1. The abundance of current technical magazines and articles researched by the participants provided adequate coverage of the computer's diverse uses in present day situations.

2. By providing an abundance of technical material to the participants, research was stimulated. The provision of materials eliminated the frustrations normally encountered when proper technical materials are unavailable.

3. The enthusiastic guest speaker provided the atmosphere of "it can be done". The spirit was highly evident in the classroom.

4. The level of objectives attained in this unit was more than satisfactory, especially when the second classroom approach was used.

Problem Areas.

The only major problem which appeared was lack of sufficient discussion time in the second group.

Recommendations.

Very strongly recommended is the second approach including a lecture from an educator involved in data processing.

Individual Problem

Content.

Guidelines to be utilized by the participants in the development of each individual problem were presented.

Objectives.

1. To allow each participant to choose a problem of interest to him which can be alleviated by means of data processing.

2. To allow each participant, individually to develop and implement a data processing system which would utilize the knowledge obtained during the course.

3. To measure the value of the training received in the course. This value can be measured by the quality of the participants finalized projects.

Methodology.

Preparation for the Individual Problem actually began one month prior to the actual unit. At that time each participant was required to submit a proposal describing his problem selection. After submission, staff members studied each selection in order to determine its feasibility. If a submitted problem selection was found to be impractical, the participant was guided to a more appropriate area. Two weeks prior to the Individual Problem unit, each participant was to submit a second, more detailed, proposal on problem selection. Within this proposal, each participant was to define his problem, state the purpose of his proposed study, and provide the methodology of implementing his system. The purpose of requiring a second proposal submission was to insure that: (1) no confusion existed between participant and problem selection, and (2) no time would be lost by any participant getting "off on a tangent". The second proposals were also examined closely by staff members, thereby enabling participants, whose proposal showed signs of confusion, to be guided toward a more direct approach.

During this time, team effort was utilized within the class. Ten participants were assigned to each instructor for guidance and consultation. In this manner, more individualized attention and guidance was provided, in that each instructor was able to become more thoroughly familiarized with each project.

Participants were required to develop, implement and completely document their problem selection. Final documentation was to include a complete system description together with the necessary flow charts, and layouts of all files used.

Participants were strongly encouraged to attend all classes during this 35 hour unit. In this way, close guidance control was provided.

Conclusions.

1. All participants made a problem selection.

2. All participants developed and implemented their problem selection.

3. All submitted projects were evaluated by staff members.

4. A more than satisfactory level was attained on objectives number one and two. The majority of the projects evaluated were average and above, and a number were rated as excellent.

5. While the majority admitted an abundance of grueling effort and much energy was required, they also admitted to a feeling of intense satisfaction and a final integration of course content.

Problem Areas.

This study area with the fall group began just prior to Thanksgiving and continued on through the end of the year. As can be deduced, the busy holiday season confounded the work effort.

Recommendations.

The use of additional analysts to provide individualized attention is an excellent aid and its use is strongly recommended. When possible no more than ten participants should be assigned to one analyst.

APPENDIX I

Summary of EDITS Class Hours

	Total Class Hours Utilized	
	Group I*	Group II*
I. Phase I - General Background and Programming		
Evolution of Data Processing	7.0	7.0
Data Representation and Management	7.0	7.0
Concepts of Data Processing Hardware	7.0	7.0
Concepts of Data Processing Software	14.0	14.0
Computer Processing Techniques	7.0	7.0
Decision Making Techniques	7.0	7.0
Guest Lecturer	3.5	3.5
General Review	3.5	3.5
COBOL Programming	45.5	45.5
	101.5	101.5
II. Phase II - Techniques and Applications		
Data Processing Systems and Procedures Concepts	17.5	17.5
Integration of Systems and Programming	21.0	21.0
General Review	0.0	3.5
Practical Applications in Industry	10.5	10.5
Practical Applications in School Administration	10.5	10.5
Advanced Class Problem	21.0	31.5
Information Retrieval	10.5	7.0
	91.0	101.5

III. Phase III - Advanced Applications to Individual Disciplines		
Concepts of Computerized Instruction	10.5	10.5
Selection of a Computer	10.5	10.5
Data Processing Teaching Aids	3.5	3.5
Current Applications in Education	7.0	3.5
Individual Problem	35.0	35.0
	66.5	63.0
TOTAL	259.0	266.0

* Group I - those participants who began the course on February 3 and completed on September 29, 1969.

Group II - those participants who began the course on February 3 and completed on December 30, 1969.

APPENDIX J
Participants Completing EDITS

NAME	DISCIPLINE	SCHOOL
1. Beltrami, J.	Business Ed.	Freeland
2. Berger, M.	Guidance	Lake Lehman
3. Cardone, J.	Business Ed.	Nanticoke
4. Cardone, M.	Business Ed.	Northwest Area
5. Christian, H.	English	Northwest Area
6. Daru, G.	Guidance, Math.	Wilkes-Barre
7. Drobnicki, M.	English, History	Crestwood
8. Elias, M.	Data Processing	Wilkes-Barre
9. Evangelista, L.	Principal	Hazleton
10. Ewasko, W.	Business Ed.	Wilkes-Barre
11. Fidrych, S.	Industrial Arts	West Side Voc.
12. Gattuso, S.	French	Hanover Twp.
13. Good, S.	Elementary Ed.	Nuangola
14. Hontz, A.	Business Ed.	Dallas
15. James, C.	Principal	Lake-Lehman
16. Kepner, F.	Superintendent	Wilkes-Barre
17. Kepner, M.	Business Ed.	Wilkes-Barre
18. Kundla, J.	Business Ed.	Pittston
19. Lipiec, E.	Business Ed.	Wilkes-Barre
20. Marr, R.	Mathematics	Dallas
21. Millard, A.	Mathematics	Wyoming Valley
22. Miscavage, E.	Industrial Arts	Wilkes-Barre
23. Mischak, P.	Chemistry	Hanover
24. Peel, J.	Superintendent	Wilkes-Barre
25. Petrenchak, J.	Spanish	Plains
26. Powell, R.	Data Processing	West Side Voc.
27. Price, M.	Business Ed.	Wilkes-Barre
28. Redgate, M.	Mathematics	Crestwood
29. Riehl, Z.	Elementary Ed.	Lake-Lehman
30. Rother, D.	English, Math.	Hanover
31. Rovinski, N.	Psychology	Wilkes-Barre
32. Sable, M.	Music	Wilkes-Barre
33. Sabol, N.	Business Ed.	Wilkes-Barre
34. Schappert, A.	Library	Wilkes-Barre
35. Shemanski, H.	Data Processing	Wilkes-Barre
36. Solack, E.	Business Ed.	Wilkes-Barre Twp.
37. Templin, F.	Physics	Dallas
38. Vernarski, N.	Business Ed.	Hanover
39. Wazenski, J.	Industrial Arts	West Side Voc.
40. Yuhas, J.	Industrial Arts	Pittston
41. Brislin, I.*	Business Ed.	Col. Misericordia
42. Gibbons, Sr. M. L.*	Business Ed.	Col. Misericordia
43. Groblewski, M.*		
44. Krawec, E.*		Kings College
45. Valetta, Dr. C.*	English	Kings College
46. Wells, J. *		

*Auditor

APPENDIX K

Follow-up of EDITS Summer Participants

1. Helen Christian. Mrs. Christian teaches remedial reading to 7th and 8th grade students in the Nanticoke, Pennsylvania School District. This has placed her in a very advantageous position for bringing about the awareness of the computer to her students.

Mrs. Christian employs the use of current literature including magazines and journals, in her reading classes. Due to the numerous articles on computers and automation now appearing in current literature, Mrs. Christian finds many articles on computers being used in her reading classes. The result, she finds, has been two-fold: (1) the students are better motivated in reading due to their desire to know more about the mysterious computer, and (2) she's now able to provide simple, yet technically correct answers to their many questions regarding the computer. In all, the end result is a better motivated and more informed student.

In addition, Mrs. Christian contributed to several discussions held by school personnel in fall 1969, in conjunction with automation of its payroll system.

Regarding her future plans for applying her data processing knowledge, Mrs. Christian is seriously contemplating expanding her present data processing knowledge with additional course work in the hopes of teaching it on the junior and senior high school level in the future.

2. George Daru. Mr. Daru functions both as a mathematics teacher and guidance counselor at Wilkes-Barre Township High School, Wilkes-Barre Township, Pennsylvania. Weekly, he, together with Robert Zavada, a former EDITS participant, conducts a guidance session for eleventh grade business-commercial students. The purpose of the guidance session is to aid students in planning for their futures by informing them of the various career fields available to them. In conjunction with this purpose, Mr. Daru has informed students of the ever-increasing personnel needs in the field of data processing. To acquaint these students with the field, Mr. Daru has been teaching data processing on a one-period per week schedule. Notes taken during EDITS classes were used as a basis for his lesson plans; however InTech is now supplying him with the technical material.

In addition to establishing a limited course on data processing for the commercial-business students, Mr. Daru is reaching the Mathematics and Science students at his school. He also functions as counselor for the Mathematics and Science Clubs at Wilkes-Barre Township High School where he has been using computer topics for discussion groups.

Future plans for data processing at Wilkes-Barre Township High School have already been formulated. Through discussions with his school principals, Mr. Joseph Riley and Mr. Mitchell Czock, Mr. Daru is establishing a formal data processing course for business-commerical students in 1970. (The limitation to this single discipline presently is due to scheduling problems). The curriculum planned to be used is the Data Processing Curriculum for Educators, as used in the EDITS course. Supplementary technical material will be supplied by InTech Corporation.

He initially plans to establish some form of ability selection criteria. This selection criteria will be established by means of testing the students applying for the course, using the Programmers Aptitude Test (PAT). It might be noted also that he plans to use the same test in guiding able students toward computer career fields.

He hopes too, that as the course evolves, student scheduling in later years will permit inclusion of Mathematics and Science students.

There is no doubt that Mr. Daru conscientiously is attempting to reach all disciplines and to pass on to others the knowlege he obtained through EDITS.

3. Mary Ann Drobnicki. Teaching English and History at Crestwood High School, Crestwood, Pennsylvania, Miss Drobnicki finds, at present, no direct classroom application of her data processing knowledge gained through EDITS.

However, her school district is seriously contemplating bringing data processing into the school and has organized a committee for this purpose, which includes Miss Drobnicki.

4. Michael Elias. Already an instructor in data processing in the Wilkes-Barre City School District, Mr. Elias enrolled in the EDITS course in order to expand his existing knowledge of data processing. Prior to the course, Mr. Elias had no system background, either in formal course work or in experience. As a result of the systems course work covered in the EDITS curriculum, Mr. Elias now is including in his own curriculum information on systems analysis and design. As future courses and curricula evolve, expansion on these topics will be made.

5. Stanley Fidrych. Functioning as Machine Shop Instructor at West-Side Vocational Technical High School, Pringle, Pennsylvania, Mr. Fidrych finds that due to the EDITS course he is now able to understand up-to-date technical articles which interrelate his discipline with data processing. He feels his students are reaping the benefits of his expanded understanding. Many technical innovations employing the computer in industry such as process-control and numerical-control operations, are not now vague to him as they once had been.

His hopes for the future are broader. The school in which he teaches is, in the very near future, purchasing a computer. Mr. Fidrych hopes that with a computer available to the school, he and his classes may use it to solve mathematical problems pertaining to the numerically-controlled machine which is already situated in the school.

With two other EDITS participants, he has become involved in forming an integrated curriculum in order that all desciplines within the school may justly benefit from the data processing equipment which will be present on their school site in the near future.

6. Arthur Hontz. Mr. Hontz teaches Business Education in the Dallas Senior High School, Dallas, Pennsylvania. Included in his texts in the Office Practice classes are practice sets on Automation. Prior to the EDITS course, Mr. Hontz was required to teach the sets on Automation, which he did, with little understanding and much apprehension. His students, he felt, gained little. After completing the EDITS course he is able to teach the material on Automation with muchconfidence and ability, thereby passing on to his students accurate technical information.

In the future he sees more extensive teaching of data processing within the high school and involvement in attendance accounting and grade reporting systems.

7. Eva Lipiec. Mrs. Lipiec is a teacher of Business Education at G.A.R. High School, Wilkes-Barre, Pennsylvania. During the school year 1968-69, new texts were introduced into the school for the Business Education courses. The new texts contained sections on data processing which were totally unfamiliar and foreign to her. Had it not been for her participation in the EDITS course, she claims, she would have been unable to teach the material to her students, and so would have deprived them of a wealth of knowledge which would be required of them in the business world. Being an extremely conscientious teacher, she is indebted to EDITS for providing her with the knowledge of data processing which she needed.

By means of bulletin board displays, Mrs. Lipiec has been providing students both with an awareness of the computer and a motivation to the computer field.

A year's subscription to Datamation, a monthly technical journal for those in the computer field, was obtained for all EDITS participants. Mrs. Lipiec regularly supplies her copy to the school library. Accordingly, it served as a major point of interest not only to those students in the commerical field, but also to those students contemplating careers in Mathematics, Science and Engineering.

In addition to the above, Mrs. Lipiec has been actively engaged in teaching an evening adult key-punching course in the Wilkes-Barre School District during the fall semester of 1969.

Because of the interest in data processing catalyzed by the EDITS course, Mrs. Lipiec chose to supplement her new data processing experience by auditing a programming course offered by the Wilkes-Barre City School District. She plans to further expand her data processing knowledge with additional programming courses.

8. Joseph Petrenchak. Proving that data processing can effectively be applied to all disciplines, Mr. Petrenchak, a teacher of Spanish in Plains Memorial High School,

Plains, Pennsylvania, is now teaching rules of Spanish grammar via the flowchart. To accomplish this, Mr. Petrenchak related to his Spanish classes the techniques used in data processing, that is, problem solution through charting. Uniquely he explained that the logic of problems and their solutions can be best clarified and observed by their schematic representation. Thus, he brought to the Spanish students the logic of the flow chart and effectively applied it to their problems in Spanish grammar.

Mr. Petrenchak has been called upon by school officials to lecture to the school personnel in the district during a Teachers Inservice Program on the Role of the Computer in School. In addition he serves as consultant for any data processing literature coming into the district.

Due to his innate ability, coupled with the knowledge and experience gained through the EDITS course, Mr. Petrenchak, in addition to his full time job as a Spanish instructor, now holds a part-time position as instructor of data processing on a Computer Science Program for Educators. As such, he reaches some 35 educators in the Columbia, Carbon and Luzerne counties of Pennsylvania.

Concerning future applications, Mr. Petrenchak has already been scheduled to speak to senior students within his school district who are interested in or who wish to gain additional information on the field of data processing.

Plans desired by Mr. Petrenchak for the future but infirmly planted due to lack of computer facilities, are the development of Computer Assisted Instructional courses (CAI) in Spanish.

9. Robert Powell. Presently employed as instructor of data processing at West-Side Vocational-Technical High School, Pringle, Pennsylvania, Mr. Powell claims the information derived from the EDITS course has aided him in three ways:

(1) Being already a data processing instructor,

Mr. Powell feels the course has supplemented his knowledge thus enabling him to become a more informed instructor.

(2) The system studies gained through EDITS enabled him to design systems for his school district consisting of five schools. Systems which Mr. Powell has now designed consist of: a limited Student Scheduling system, a Grade Reporting system, an Attendance system, and a Student Profile system.

(3) Made him aware that data processing is and should be effectively applied to all disciplines. Therefore, he has been the catalyst for developing an integrated data processing curriculum within his school.

The district in which Mr. Powell is employed is in the process of selecting a computer. Due to the fact that Mr. Powell is the sole data processing professional in the school system, a major portion of the responsibility of computer selection will be deemed to him. Since he's had no prior experience in selecting computer hardware, he feels the information gained in the Computer Selection study in the EDITS course is invaluable to him.

In addition to computer selection in the near future, plans for development of the following systems are underway: an expanded system of student scheduling, payroll, personnel and budget systems.

10. Dorothy Rother. To date, Mrs. Rother, who teaches English at Hanover High School, Hanover, Pennsylvania has been unable to apply directly her data processing knowledge in her class. Due to the lack of environmental and organizational factors in her school district, she is unable to foresee her knowledge being directly applied in the near future. However she plans to continue to develop her new-found knowledge.

11. Miriam Sable. Teacher of Music in Coughlin High School, Wilkes-Barre, Pennsylvania, Mrs. Sable is now aiding students interested in electronic music. Prior to the EDITS course, she was handicapped with the lack of understanding of the technology discussed in available literature on electronic music.

Mrs. Sable developed a CAI course design in Music Theory as her Individual Problem during the EDITS course. She is actively planning now to use this course in her music classes. Since the hardware necessary for CAI is unavailable in her school district, she will be using the material she developed as a Programmed Instruction (PI) course in Music Theory. The course, as developed by Mrs. Sable, will aid not only those students entering as a group, a class in music theory, but in addition will be an invaluable aid to the music teacher in the case of late entrants since then the student can learn on an individual basis without the constant presence of the instructor. She plans also to continue developing CAI programs.

12. Henry Shemanski. Mr. Shemanski is a data processing instructor for the Wilkes-Barre School District, Wilkes Barre, Pennsylvania. As a result of the EDITS course he's now incorporated into their data processing curriculum a limited study on system analysis and design which comprised a major portion of the EDITS curriculum. Prior to the EDITS course, Mr. Shemanski had no systems experience in his educational or work background.

In addition, Mr. Shemanski, in teaching the ForTran language in his programming course, is now able to contrast ForTran, a scientifically oriented language, to COBOL, a business oriented language.

With approval, he hopes to expand the present data processing curriculum to include classes on systems analysis and design and another on COBOL with the advent of the new East Side Vocational-Technical School due to be completed in 1971.

13. Joseph Wazenski. Mr. Wazenski, an instructor of drafting at West Side Vocational-Technical School, Pringle, Pennsylvania, is bringing into his classroom quite a few discussions on the computer and computerized drafting. By means of the technical information derived through EDITS, his understanding of the present day technical literature pertaining not only to his discipline but to related disciplines, has opened up to him a wealth of information which he is carrying into the classroom. In addition, Mr. Wazenski

claims, he now recognizes the effect on the lives of the students if the instructor due to the lack of understanding, is unable to convey to them, some understanding of the present day technology. He is involved in the development of an integrated data processing curriculum encompassing all school departments.

Mr. Wazenski has been instrumental in establishing a data processing course to be provided by West Side Central Catholic High School, Kingston, Pennsylvania. The course, an elective, is to begin in February, 1970, and is to be presented initially as a seminar to eleventh grade students. In the school year 1970-71, the course is proposed to be offered as part of the regular school curriculum to students on the eleventh and twelfth grade levels. Mr. Wazenski, together with Sister Mary Luke Gibbons, another EDITS participant, are tentatively scheduled as instructors for the course.

14. Joseph Yuhas. Mr. Yuhas, an instructor in Industrial Arts at Pittston High School, Pittston, Pennsylvania, is now keeping up to date with technical literature within his own and related disciplines. Specifically, he points to technological processes such as numerical control machinery. Prior to the EDITS Course, he was unable to understand the present day technical terminology and so was unable to carry into his class room new technological innovations to which the students would be exposed upon completion of their education.

Concerning the future, Mr. Yuhas feels that he will request a numerical control machine be purchased for classroom use as soon as it is deemed feasible.

APPENDIX L

Participants Evaluation of EDITS

Joseph Beltrami
Business Education

I am gratified that I have participated in such a practical and in-depth course geared toward direct application of working principles in a specific area.

As you know, the field of data processing is rapidly becoming an integral part of most school systems, especially those with more progressive views and ideas toward preparing students for life.

The calibre of instruction provided by the staff of the InTech Corporation leaves nothing to be desired - instructors are extremely well-prepared and through their many years of experience in the field of data processing, are able to answer effectively any questions any participant may have; and, as well, they have helped solve most of the resulting problems and their application toward education.

I have never before, in all sincerity, been a participant in a program which offered direct application of the teaching materials to the field in question - and, of course, the field in question in this instance is the field of education. As a result of the outstanding effort put forth by your corporation, I cannot visualize any instance in which any participant cannot use any phase of the material presented.

It is my definite opinion that the funds expended in this instance for the sole purpose of educating educators in the area of practical applications of data processing to education and their, in turn, educating other educators in the area of data processing applications to education have been very wisely spent. In the very near future, the benefits of this program and similar Federal programs will show tremendous results, for, without a doubt, these people who have successfully completed the project EDITS course are now in a position to return to their respective school districts, or, for that matter, any school district, and do a fine job in assisting their fellow teachers and administrators in adapting and making the transition from manual data processing to electronic data processing much more understandable and much easier so that the transition can be a very smooth one and not interrupt the normal, every-day running of a district and cause any break in the flow of data being supplied through the educational system. Of greater consequence is the fact that the personnel of the district will be in a position to utilize the electronic data processing system to achieve maximum benefits from its operation - their possession of a working knowledge of data processing concepts will enable them to do so.

Programs of this type, as long as they are sponsored on the high level of calibre as the program sponsored by InTech Corporation, will certainly result in complete change-over to data processing in the field of education at a minimum cost to the taxpaying public. The number of teachers and administrators in any program who go out into the field of education and teach other teachers and educators is small in comparison to the total results achieved by the program; programs of this type can generate a complete understanding of data processing techniques and their application to education throughout the entire country. Moreover, it also means that on a per educated teacher basis, the amount of money expended by the Federal Government will be meager, if not nil, because school districts, through their own in-service training programs taught by former participants in courses such as project EDITS, can certainly educate all of the district's personnel in the concepts of data processing and their application to an individual teacher's discipline.

Aside from the standpoint of teaching educators data processing techniques in their respective fields, there is a very important consideration which also should be clarified: Many of the participants of project EDITS are now in a position to assist their school districts in establishing new techniques and systems for the overall benefit of their school districts so that administrators especially will have information available to them with regard to their particular school district. As it now stands, the systems analysts and data processing personnel establishing systems for school districts do not have an educational background and establish these systems through a mechanical process of standard data processing procedures. In my opinion, only an educator or a data processing systems analyst with an educational background can efficiently set up an entire school system utilizing data processing techniques. In this manner, the district's system will be custom made for the needs of this district's personnel.

In closing, I should like to say that in the period of time covered by project EDITS, the amount of material which has been presented in the area of data processing with regard to education leaves no phase to be still covered. InTech Corporation has put an overwhelming amount of effort into presenting a dynamic, thorough, and comprehensive program, which, in turn, has assured all participants of a high-quality education.

Maryann Berger
Guidance

One of the basic purposes of the course was to give teachers a working knowledge of data processing. This, I feel was accomplished in most instances. The instructors knew their material and subject and were able to explain it well. However, I felt that an attempt was made to try to cover too much material. As a result, some areas of interest were not covered as adequately as desired. It might be worthwhile to devote time to class suggested topics.

Another problem area was class length. After a full day of teaching, three and a half hours requires a lot of sitting time,lecture combined with lab work is not as difficult to take as straight lecture. I would definitely advise greater use of lab work.

Materials were excellent and there was an adequate supply of them. The use of these by instructors made many subject areas more understandable.

On the whole, much was gained from the course.

Imelda A. Brislin
Business Education

I thought the course was conducted in a very professional manner. It was expertly planned and presented so that all important aspects of information were covered.

I want to compliment all of the staff members with whom I was personally involved. Mrs. Onufer, the instructor is a highly skilled teacher with singleminded dedication to her subject. She has a profound knowledge of her field and the ability and patience to communicate this knowledge in the classroom. It was obvious in every class session that she was extremely well prepared.

I also want to thank Mr. Bob Sepela, the systems analyst, who worked with me on my individual problem. He is a competent, patient and courteous person. His assistance was invaluable in guiding me in my work.

I feel I have gained a great deal in understanding the heretofore nebulous world of the computer and want to thank you for offering this excellent course.

John J. Cardone
Business Education

Yes, I can say that it met its objectives ... that is to say it gave me a much greater insight as to the value of data processing, computers and their tremendous possibilities in our future.

Let me thank you for making it possible for people such as myself to have the opportunity to partake in a class of this sort. I would also like to commend Mrs. Onufer on her ability and patience with me. There were times when I was so tired I am sure I missed pertinent information. When this occured, it was difficult to concentrate, and therefore I was the loser. Even under these circumstances, Mrs. Onufer made the material interesting enough that I did get the greatest amount. While I am on the subject, I would also like to thank Mr. Walski for his help and direction in my individual problem. For that matter, they were all friendly and helpful.

There were some weaknesses, but I am not sure that they were unavoidable. This would be the many different teachers in the program with different skills. Also, I felt we saw too few examples of the hardware itself.

Maurice D. Cardone
Business Education

I have always been fascinated and intrigued by the words data processing and automation. When the opportunity presented itself to learn the subject and fulfill my certification responsibility, I was anxious to register for the course.

I can truthfully say that I have not been disappointed. The course was what I expected with one exception. I thought we would be exposed more to the actual equipment and its operation.

We were quite fortunate to have very competent instructors in the field. The changing of instructors may have been a little detrimental because of their different methods of teaching. Our final instructor, Mrs. Onufer, should be complimented for the fine job she did in taking both classes over and in coordinating the instructions. Through her patience and understanding, I can honestly say that during the last few months, things started to fall in place.

The group problem and the individual project have been most rewarding. You can actually see the knowledge you've acquired previously being put to use. Again Mrs.Onufer's patience and guiding hand made these two final projects, which seemed insurmountable at the time, enjoyable and gratifying.

To sum things up, I would say the course has been very good. I've learned a lot of things that puzzled me about computers and quite a bit that I knew nothing about previously. Now my teaching of business subjects can be broadened by giving the students an insight into the world of Data Processing and Computers. The course has accomplished something for which I am grateful, I will be a better teacher, which is my ultimate aim.

George M. Daru
Mathematics & Guidance

I am writing this brief letter to you to thank InTech for affording me the opportunity to take the EDITS course.

The course was one of the most worthwhile and valuable courses I have taken in many years.

I believe the instructors we had, especially Mrs. Onufer, did a tremendous job. In fact, Mrs. Onufer, through her enthusiasm and capability with her subject matter, has inspired me in my own teaching efforts.

The value of the EDITS course, although I am unable at present to incorporate it into my teaching, has proved invaluable in my Guidance Classes.

I am at this moment attempting to incorporate it into a non-credit course for Junior Commercial students. Our administration seems to look at this quite favorably.

I also believe that I will be able to use the information obtained from this course in working on my Scholarly Paper, a requirement for my Master's degree in Guidance at the University of Scranton.

I can only reiterate my thanks for offering such an excellent course and allowing me to participate in it.

I hope you will be able to offer this course to as many educators as possible since it is so timely and in such depth.

Mary Ann J. Drobnicki
English & Social Studies

I have found your course, the Educators Information Technology System to be very sophisticated.

While attending any of the finest colleges and universities, I have not found what I have found in your classes, and that is team teaching: where teachers formed groups, shared ideas and worked together to solve a problem or worked on a project. Your instructors were very cooperative in helping us and guiding us in our studies.

Classes were well planned and organized, and instructors the finest.

I also found your library very interesting and updated with latest information on computer science.

Lawrence C. Evangelista
Secondary School Administration

From the standpoint of an administrator, I found the course to be extremely valuable for teachers, counselors and administrators. Data processing can be used most effectively in all disciplines of the curriculum as demonstrated by the individual problem worked out by the teachers and counselors in the EDITS class.

As for school management, it is a valuable tool for grade reporing, attendance and scheduling. In scheduling, it can do the work in scheduling the traditional class periods or the new flexible or modular scheduling that is, the trend of modern scheduling of schools today.

I found the quality of instruction to be excellent and at times superior, especially, referring to Shirley Onufer, who in my opinion is an excellent, conscientious teacher who did an extremely difficult job well.

Your idea of using Fred Walski and Bob Sepela, systems analysts, as resource persons is a modern technique of teaching - the trend in modern education is for students to have resource people available in classrooms for on-the-spot assistance and guidance.

I will heartily recommend InTech to continue the fine work and service your organization so ably provided for educators of Luzerne County this year.

William J. Ewasko
Business Education

The following list of benefits accrued to me by taking the EDITS course:

1. Great wealth of enrichment material for myself.
2. Useful notes for possible future course, in data processing on high school level.
3. The course bridges the gap between fact and fiction - on the capabilities of the computer.

I feel the instructors were excellent and imparted a great deal of their "on the job" experience to the class.

Suggestions for future course:

1. More audio-visual aids.
2. Outline of lectures.

Sebastian Gattuso
French

I found the course extremely challenging. It has opened new fields of wonder which I had not previously realized existed.

The course was expertly taught, and logically unfolded the world of data processing giving each, I thought, something solid to grasp hold of for further use in a definitely machine-orientated life.

I thoroughly enjoyed the challenge which the course offered.

Sister Luke Gibbons
Business Education

The course, Educators Information Technology System, which I have just completed was one of the finest, if not the finest course, I have ever taken.

I make the above statement for the following reasons:

1. The course content was certainly selected with great care and thought. This was evident from the initial outline we received.

2. Each lesson was well planned. I will never cease to marvel at the ability of the instructors to lecture for 7 hours, or even 3½ hours, and at the same time hold the attention of the class.

3. Each instructor, and we did have a few during the period of the course, gave evidence of having a very fine background in computer technology, systems and programming. No matter how technical the question, and at times the men became very technical, the instructor was able to answer.

4. Being a teacher, I can say that teachers make for a very critical class. At no time during the period of the course did I hear criticism leveled at an instructor. I think this is a real compliment for the high calibre of instruction we received.

5. The cooperation, friendliness and help we received from the entire staff of InTech was tremendous. We were encouraged to seek assistance. It was a wonderful example of what should be practiced by all of us who are involved in this gigantic task of education.

6. This course has proved valuable to me already in my business teaching. I believe it will become increasingly valuable in the future because of the rapid progress computer technology is making in all areas of business, education etc.

It has served also to make me more curious about the possibilities of the computer in education, and has aroused in me a desire to do more reading on this subject.

The individual problem was a great learning tool. It did become a bit of a grind at times, but I think we all felt challenged and derived a great deal of satisfaction from the work. Here again, the excellent assistance we each received from members of the InTech staff was unsurpassable.

The only suggestion I could make, and I don't know if this is possible, is that the class be held responsible for some outside assignment each week. As human beings, we all tend to be lazy and at times self-discipline needs an assist.

Sophie T. Good
Elementary Education

When I registered for this course, I had no idea how influential the computer was in our everyday life, or what a great need there was for teachers to teach Data Processing in our secondary schools.

InTech Corporation has served a tremendously valuable service by sponsoring this course. Many schools can now incorporate in their curriculum data processing. This will not alleviate the great need, but it is a good beginning.

The course was of the highest quality, very informative, educational and gave the teacher the necessary training and preparation to teach Data Processing.

The teacher, Mrs. Onufer, was a superior teacher. She was always well prepared, knew her subject matter from A to Z. Very capable to answer any questions and very helpful in all our problems.

The only suggestion I have is that the individual problem should be done earlier in the course. For instance, our individual problem should have been started after we finished our advanced problem. I may be wrong, but as I recall our first meeting before classes began, the individual problem was to be optional, now it seems to have become a compulsory item.

On the whole, I have enjoyed coming to classes very much. I have acquired a tremendous amount of knowledge concerning computers which otherwise I know I wouldn't get.

This course has done one other thing for me. It has made me more tolerant of individual children who have a difficult time to learn. This is the first time a course has given me a great challenge, because of this, I have learned tolerance with other individuals.

Charles C. James
Elementary School Administration

The over all EDITS course was very informative and beneficial to my position as a principal. I feel that the information received on various aspects of computer operation and use in the schools of the future will be a great asset to education.

The instructors were understanding and very patient with this class. I especially commend Mrs. Onufer for the unique job she did in the massive hours of lecture. Her assistance during the practical applications was greatly appreciated. Mr. Sepela was a great help in assisting me with my final problem. Your staff has done a superb job.

I would recommend that additional time be given to work on the individual problem. I found that in recent weeks I was rushed in order to complete my problem.

The combined class periods and lecture classes made the sessions too long. Possibly in the future, the lengthy lecture hours could be incorporated to include more practical application.

Materials and supplies were more than ample for all the work. Audio-visual aids used were sufficient.

The over-all class from February to December was very good and informative. I deeply appreciate the opportunity to have had this experience.

Joseph Kundla
Business Education

I have found the course extremely rewarding. The following is a list of my personal feelings about the course:

1. I believe that Mrs. Onufer deserves a round of applause for her kindness shown to all in the class.

2. She was very patient, helpful, and very understanding of each individual's problems. She must be commended for her willingness to help.

3. The only weakness in the course was due to the fact that Mr. Martin did not present the lessons as well as Mrs. Onufer and as a result, much of what he did teach, was lost to us.

4. The course, I believe, was very well planned. Course content was well covered and I feel I have learned a great deal.

5. May I suggest that you offer a course in CAI. Sign me up, if you do!

Robert Marr
Mathematics

I am thoroughly pleased with the EDITS course which was offered by your organization during this past year. As a result of this course, I felt better prepared to make use of the various facilities made available by the computer. The CAI courses which will eventually become available for all will be very beneficial to the student and also to the teacher.

A few suggestions which I would like to make are:

1. More time spent on documentation.
2. No classes during holiday vacations.
3. Schedule arranged so there is no rush at the end.

I would like to commend Mrs. Onufer. She is an excellent and most conscientious teacher. I wish I would have had her for the entire course.

Joseph Petrenchak
Spanish

The course was conducted in a very professional manner, utilizing many effective methods of presentation. The instructional staff was very knowledgeable and provided excellent general instruction as well as personal attention to individual problems.

There is no doubt in my mind that the course was very thorough in content. Much material was presented that was useful, even though it was not necessarily needed for the particular problems that were part of the course.

Many topics were introduced, which, in the event of future needs, could be further researched by interested participants.

Personally, EDITS has been of a great value since I became involved in teaching a similar course as a result of my participation in this project.

Generally, I believe that the value of the course varies with the area of concentration of each individual participant. They have all been exposed to new concepts which will no doubt have an influence on them in the future. It will also be easier for them to pursue these concepts further because of what they have learned.

However, I feel that many participants will not have the opportunities to use their knowledge to its fullest extent. This is not a reflection on the course, but rather, on the educational system. There are no provisions made by the educational system whereby knowledge gained by programs of this type is officially recognized.

I am confident, however, that the participants will enlighten many of their fellow educators on the developments in the field of data processing and that their knowledge will have an impact on education.

Zack C. Riehl
Elementary Education

Quality and Value:

1. Well planned.
2. Your instructors have patience.
3. Interesting.
4. Informative.

Suggestions:

1. More lab work.
2. Less lectures.
3. Hours much too long.
4. More individual work with more instructors like towards the end of the course.
5. Short homework lessons.
6. More problems on education not on voting, store inventory or others.

Henry W. Shemanski
Data Processing

Please excuse my lateness and my bad printing, but I'm leaving on a trip in one half hour and had forgotten about returning your correspondence.

For my part, Project EDITS was very beneficial but I do believe it was because of my previous data processing experience. I do believe some of the other people would have benefited more from the course if they had studied and operated the equipment about which they talked. Then again, since I think the course was designed for data processing applications, much of the introductory material could have been skipped. Whatever the purpose of the course, I know of several of my classmates who were confused because of not understanding data processing equipment.

Thank you once again.

Edward D. Solack
Business Education

May I express my appreciation to the Department of Health, Education, and Welfare; and to InTech Corporation for providing me the opportunity to take the Educators Information Technology System Course. It would have been a financial hardship on my family if I had to rely on my own financial resources.

This course has been a rewarding and stimulating experience for me. It has removed the "hokus pokus" of computer technology. I now believe that a teacher without some knowledge of computer technology is handicapped.

I also enjoyed meeting and working with fellow teachers in the classroom. We were able to share and work out mutual problems. The course was very well planned and organized. The instruction was excellent. I must admit, however, I had a preference for Mrs. Onufer, whom I regard as a truly exceptional teacher.

Miriam Sable
Music

Thank you very much for helping to provide for me the opportunity to expand my knowledge in the fields of computers, data processing and related materials through the EDITS course, as presented by the InTech Corporation of Wilkes-Barre.

The course was well-planned. The personnel were competent and helpful and materials were excellently presented, especially by Shirley Onufer, an outstanding instructor.

Through this course, I have been given a glimpse into what, I believe, will be an important aspect of education in the near future. Hopefully, this insight is being shared with young people as well as fellow-educators and other persons with whom I communicate in my daily activities.

My main suggestion for consideration would be that - in view of the time and effort invested by both the InTech Coporation and the student-participants (educators who have already earned bachelor degrees), and since, in some colleges, courses such as this are offered for either graduate or undergraduate credits because this is a "new" type of knowledge, graduate credits would be a more appropriate type of credit recognition.

APPENDIX M

EDITS Correspondence

6

717/823-7176

+/- InTech Corporation

COMPUTER INFORMATION TECHNOLOGY

South Main Towers
116 South Main Street
Wilkes-Barre, Pennsylvania 18701

To District Superintendents
Secondary School Principals

Gentlemen:

Enclosed is the pertinent information regarding a course of study starting at King's College on January 20, 1969.

As this information states, the course is an opportunity for any educator to study data processing and computer programming under the auspices of a federal grant. Too, as this information suggests, a limitation of enrollment may be set at sixty participants.

Application blanks are enclosed.

Very truly yours,

Ellis W. Roberts, Ph. D.
Mrs. Pat Brislin
Project Directors
EDITS
Education Information Technology Systems

Announcement Announcement Announcement

What	A course for teachers called Educators Information Technology System (EDITS).
Who	Open to all teachers or administrators in the public schools.
Tuition	None--the project is funded by a federal grant through the U.S. Department of Health, Education and Welfare.
Purpose	1. To instruct teachers in the fundamentals of data processing with the most recent equipment (third generation hardware and software) thereby developing trained educators capable of understanding data processing. 2. Broaden the knowledge of educators making them aware of the impact of computers in their own lives and of existing utilization within their own disciplines, including Social Studies, English, Science, Math and the Arts.

Where and When

Classes will be held at King's College. Two sessions a week. Each session will be 3 1/2 hours in length.

Instruction

The course will be taught by staff members of Intech Corporation, Wilkes-Barre. Ellis W. Roberts, Ph.D. and Mrs. Pat Brislin will act as co-directors.

How to Register

Inform your superintendent or supervising principal--call Ellis W. Roberts, Ph.D. at 823-3123 or Mrs. Pat Brislin at 823-7176.

For Further Information

Call Doctor Roberts or Mrs. Brislin at the above numbers.

First Class Meeting

Monday, January 20, 1969, at King's College

Please post on teachers bulletin board

1. Name ____
Last First Middle

2. Home address ____
City State Phone

3. Date of Birth ____________________ Place of Birth ____________________
Month Day Year

4. Highest Degree ____
Major College

5. Number of years teaching ____________________

6. Subjects taught ____

7. School District ____

8. Building ____________________ Phone ____________________

9. Indicate all attendance possibilities:

( ) Monday – Wednesday evenings
( ) Tuesday – Thursday evenings
( ) Saturday

10. Indicate previous data processing courses

____
Briefly note

11. Chief School Officer of District ____

12. Reason for Interest ____

Signature ____________________ Date ____________________

PROJECT EDITS

EDUCATORS INFORMATION TECHNOLOGY SYSTEM

APPLICATION FOR ADMISSION

Name

Address

School District

Project Co-Directors

Ellis W. Roberts, Ph. D. 823-3123
Patricia Brislin 823-7176

A Computer Science Program
for
Educators

717/823-7176

+/- InTech Corporation

COMPUTER INFORMATION TECHNOLOGY

South Main Towers
116 South Main Street
Wilkes-Barre, Pennsylvania 18701

Dear Mrs. Brislin and Doctor Roberts:

The following staff members of the

____

School District may be tentatively enrolled in the EDITS (Educators Information Technology System) Course at King's College.

Please list the names and addresses of your staff members:

Very truly yours,

717/823-7176

+/- InTech Corporation

COMPUTER INFORMATION TECHNOLOGY

South Main Towers
116 South Main Street
Wilkes-Barre, Pennsylvania 18701

January 16, 1969

Dear Educator:

We are pleased with your response to project EDITS and your interest in participation in the Educators Information Technology System.

The Systems staff appreciates your interest in this program and expresses our best intentions of providing you a professionally and personally rewarding experience.

We request your attendance at a meeting of staff and applicants to be conducted from 7 to 9 p.m. on Thursday, January 23, in Room S115 of the Science Building of King's College. The meeting will provide an opportunity for completing registration and for organizing class periods. We will also give to those attending a complete outline of course content and objectives.

Very truly yours,

Ellis W. Roberts, Ph. D.
Mrs. Pat Brislin
Project Co-Directors
EDITS
Education Information Technology Systems

EWR:md

717/823-7176

+/- InTech Corporation

COMPUTER INFORMATION TECHNOLOGY
South Main Towers
116 South Main Street
Wilkes-Barre, Pennsylvania 18701

January 24, 1969

Mr. Joseph Beltrami
1001 East Ninth Street
Hazleton, Penna. 18201

Dear Mr. Beltrami:

You have been selected for inclusion in the EDITS computer science program.

Your section will meet in room S 115 on Saturday, beginning at 9:00 a.m., February 8th.

We are looking forward to your participation.

Yours truly,

Pat Brislin

PB:cak

717/823-7176

+/- InTech Corporation

COMPUTER INFORMATION TECHNOLOGY

South Main Towers
116 South Main Street
Wilkes-Barre, Pennsylvania 18701

January 27, 1969

Mr. Arthur Hontz
R.D. #1
Hunlock Creek, Pa. 18621

Dear Mr. Hontz:

You have been selected for inclusion in the EDITS computer science program.

Your section will meet in room S 115 Monday and Wednesday, from 6:00 to 9:30 p.m. beginning February 3rd.

We are looking forward to your participation.

Yours truly,

Pat Brislin

PB:mg

717/823-7176

+/- InTech Corporation

COMPUTER INFORMATION TECHNOLOGY

South Main Towers
116 South Main Street
Wilkes-Barre, Pennsylvania 18701

January 28, 1969

Mr. Maurice Cardone
154 East Broad Street
Nanticoke, Penna. 18634

Dear Mr. Cardone:

You have been selected for inclusion in the EDITS computer science program.

Your section will meet in room S 115 Tuesday and Thursday from 6:00 to 9:30 p.m., beginning February 4.

We are looking forward to your participation.

Yours truly,

Pat Brislin

PB:cak

717/823-7176

+/- InTech Corporation

COMPUTER INFORMATION TECHNOLOGY
South Main Towers
116 South Main Street
Wilkes-Barre, Pennsylvania 18701

February 24, 1969

Mr. Fred M. Templin
Dallas Senior High School
Dallas, Pennsylvania

Dear Mr. Templin:

This is to inform you that Mrs. Ellen McLoughlin, Guidance Specialist, will be at the Dallas Senior High School on Friday, February 28, 1969. Mrs. McLoughlin will follow the attached interview schedule on that day.

If there are any conflicts, please call the InTech office so that other arrangements can be made.

Very truly yours,

Pat Brislin

PB:cak
Enclosure

INTERVIEW SCHEDULE DALLAS SENIOR HIGH SCHOOL

Friday, February 28, 1969

11:15 - 11:50	Stemplewski, Thaddeus
11:55 - 12:30	Templin, Fred
12:35 - 1:15	Jones, John
1:20 - 2:00	Marr, Robert
2:05 - 2:40	Hontz, Arthur

717/823-7176

+/- InTech Corporation

COMPUTER INFORMATION TECHNOLOGY

South Main Towers
116 South Main Street
Wilkes-Barre, Pennsylvania 18701

August 14, 1969

Dear EDITS Participants:

We hope you have had a nice summer vacation and are ready to rejoin us in September.

We look forward to seeing everyone in class at King's College Room S115 on Tuesday, September 2, 1969 and again on Thursday, September 4, 1969 from 6:00 p.m. to 9:30 p.m. This schedule will be followed only during the first week of September. After that, classes will resume on a regular schedule of Monday and Wednesday, Tuesday and Thursday.

Since many of the Saturday group attended class during the summer, Saturday classes will be discontinued.

Would you please check below what days you plan to attend and return your answer to InTech at your earliest convenience.

Sincerely,

Ellen Jane McLoughlin

Ellen Jane McLoughlin

- -

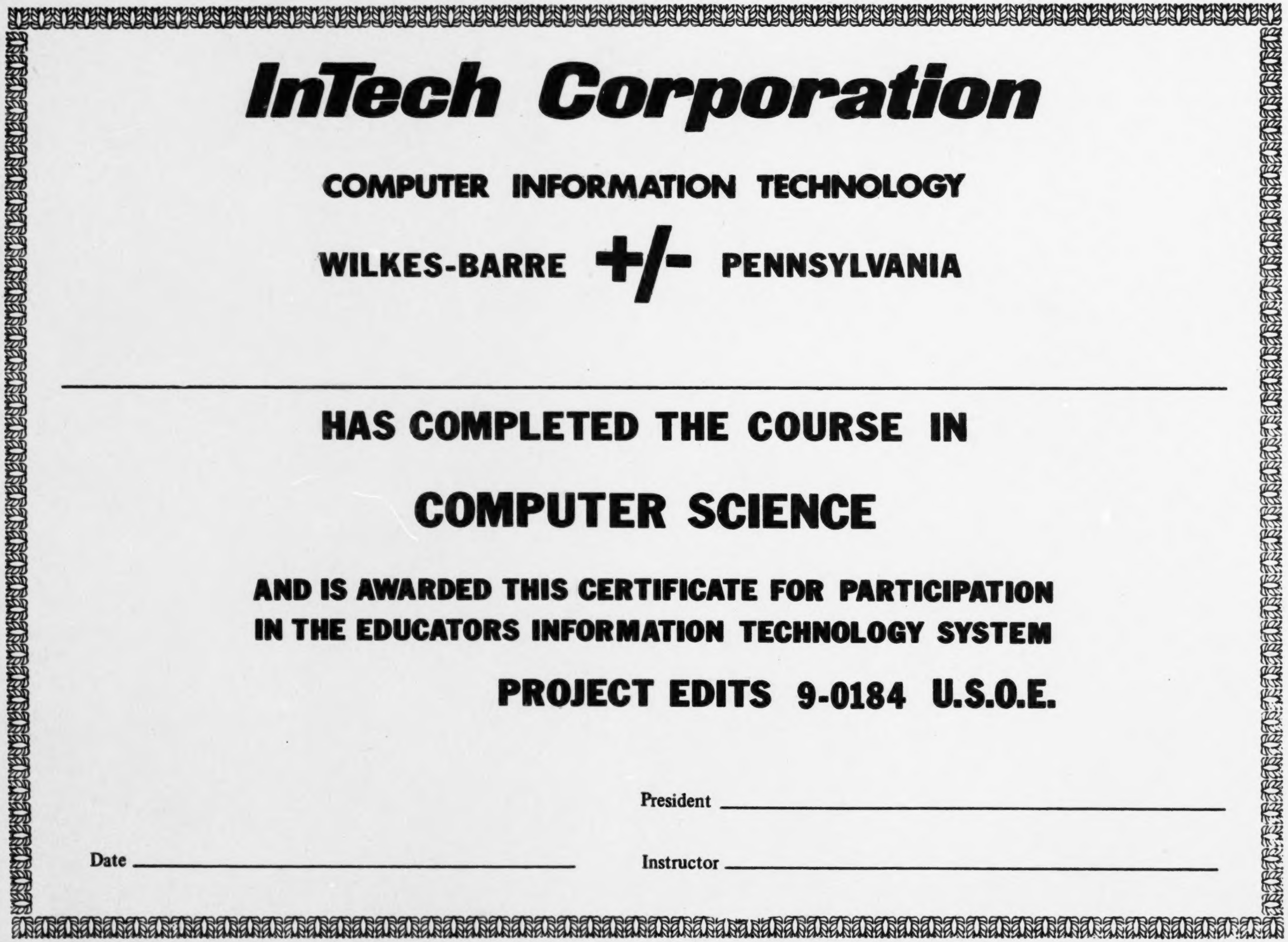
InTech Corporation
116 South Main Street
Wilkes-Barre, Penna. 18701

I plan to attend the Fall session of the EDITS program on: (check one)

_____Monday-Wednesday _____Tuesday-Thursday

Signed

_________________________(Name)



InTech Corporation

COMPUTER INFORMATION TECHNOLOGY

WILKES-BARRE +/- PENNSYLVANIA

HAS COMPLETED THE COURSE IN

COMPUTER SCIENCE

AND IS AWARDED THIS CERTIFICATE FOR PARTICIPATION
IN THE EDUCATORS INFORMATION TECHNOLOGY SYSTEM

PROJECT EDITS 9-0184 U.S.O.E.

President ____________________

Date ____________________

Instructor ____________________

APPENDIX N

EDITS Publicity

SUNDAY INDEPENDENT

Member
Audit Bureau of Circulation

WILKES-BARRE, PA., SUNDAY, MARCH 30, 1969

(UPI)
Wire News and Telephoto Service ★

Will Gain Insight on Actual Needs

Area Educators Given Review Of Computer Programming

Are computers impersonal or are they, in fact, more responsive to our individual needs?

This question was posed by Dr. R. Louis Bright, Distinguished Interdisciplinary Professor of Baylor University, who appeared at King's College recently to address local educators participating in Project EDITS (Educators Information Technology System.)

Dr. Blight was introduced by Dr. Ellis Roberts, president of the Wilkes-Barre Business College, who is co-director with Patricia Brislin, president of In-Tech Corporation, of Project EDITS.

Project EDITS is designed to familiarize teachers and school administrators already working in their field with the application of computer technology to school administration and to classroom instruction.

The curriculum used in the project was developed by In-Tech, a local computer systems company, under contract with the U.S. Office of Education and is being field tested here, using classroom facilities donated to the project by King's College.

The participants are 60 teachers and school administrators from Upper Luzerne County.

Dr. Bright, formerly an Associate Commissioner of the U.S. Office of Education, spoke of the impact of the computer on the field of education and cited several examples of how the computer has enabled school administrators and teachers to give more attention to individual needs. One university now using a computer to register students for classes found that the number of students being assigned to classes with the professor of their choice now averages 78% whereas with the manual system of assignment it was 24%.

Two Key Applications

Dr. Bright then discussed the two major applications of the computer to actual classroom work. These two applications are Computer Managed Instruction and Computer Assisted Instruction.

In the first instance, the students are given subject matter tests which the computer has been programmed to evaluate. The computer will then process the individual test papers, grading them, entering the grade in the file maintained in the computer on the individual student; analyzing the student's performance on the basis of his errors to determine the area in which he needs additional study; referring the student to the particular section of the text which explains the area he does not appear to understand completely; and comparing present test performance with past test performance to identify general areas of weakness.

The computer is then used by the instructor to determine how the class, as a whole, performed; to identify subject matter which did not appear to be understood by a large number of students, and to compare the performance of the class to that of previous classes. This information would then be used by the instructor to modify or expand course materials and to evaluate/improve teaching methods.

In Computer Assisted Instruction, the computer is used directly by the student, who is seated at a computer console. This console maye have a keyboard, similar to that of a typewriter, and may also have a form of viewing panel. The student and the computer communicate via typewritten messages and in certain instances, diagrams might appear on the viewing screen.

In the instances of visual communication, the student may be instructed by written message from the computer to identify certain areas of the diagram by pointing to them with a pen light. The computer then evaluates the response, and if it is incorrect, may advise the student of the proper response. All questions asked of the computer and all student responses to the computer are recorded in the individual student's file.

The computer may also be programmed to take certain actions dependent on the student's performance, i.e. if a student were to miss a certain number of questions, the computer would print out additional subject matter which would explain the answers and would then re-test the student before presenting new material.

Likewise, when a student has performed well on a particular section, the computer would automatically present new material, allowing each student to progress at his own rate. On Computer Assisted Instruction, the computer presents all subject matter, whereas a standardized text book is used in Computer Managed Instruction.

Dr. Bright then pointed up the fact that thought the capability of computers is very impressive, the computer is only as effective as the program on which it operates. In the field of education, the quality and effectiveness of these programs is ultimately the responsibility of the educators. With proper utilization of the computers now being installed in many school districts, school administrators will be afforded a tool that will enable them to give attention to the specific needs of their individual schools, their students, and their teachers.

The teachers will, likewise, be relieved of many of their record keeping functions so as to have more time to spend on individualized instruction. In regard to the latter, Dr. Bright said the computers have now been programmed to evaluate student essays including comments on grammar, logical presentation of material and content.

The address was followed by a question and answer period after which time many of the educators spoke individually with Dr. Bright and also with Dr. Arch Steiner and Dr. Glen Boerrigter of the U.S. Office of Education in Washington, D.C., who were in attendance at the lecture in connection with Project EDITS.

The Wilkes-Barre area was selected for the field testing of Project EDITS, but it is even more fortunate in having educators who are as progressive and eager to grasp this new tool in education as are the 60 local educators who are participating in Project EDITS.

◆

The Blue Ridge Mountains of Franklin County are considered excellent vacation areas.—PNS

SUNDAY INDEPENDENT

SUNDAY INDEPENDENT, WILKES-BARRE, PA., SUNDAY, MARCH 23, 1969

Dr. R. Louis Bright

Key Educator to Speak To 60 Local Educators

Some 60 educators from Luzerne County, who are engaged in a comprehensive data processing education program, will hear a talk tomorrow evening at King's College by Dr. R. Louis Bright, distinguished interdisciplinary professor at Baylor University.

DR. R. LOUIS BRIGHT

A former associate commissioner of the U. S. Office of Education in Washington, D.C., Dr. Blight will provide added emphasis to the $250,000 program being carried under a research contract granted to the INTECH Corporation, 116 South Main Street, city.

Project coordinators are Patricia Brislin, president of INTECH Corporation, and Dr. Ellis Roberts, president of the Wilkes-Barre Business College.

The federal grant and the arrangements for the distinguished speaker were arranged by Congressman Daniel J. Flood, who also revealed during the week that King's College had provided $12,300 toward this data processing field testing program for educators.

Prominent Guests

In the audience tomorrow for Dr. Bright's address will be Dr. Glen Boerrigter, director of Elementary - Secondary Education, Bureau of Research in the U.S. Office of Education, and his colleague, Dr. Arch Steiner, project officer for the Office of Edution.

Dr. Bright is a native of Oil City, Pa. and a graduate of the Carnegie Institute of Technology with a B.S. in Mathematics and a M.S. and D. Sc. in Electrical Engineering.

In his professional life, Dr. Bright has been intensively involved in both the field of education and the field of engineering, and more recently using these areas of discipline in combination, has become active in the development of programmed instruction. His professional experience includes seven years with the Carnegie Institute teaching Electrical Engineering, primarily on the graduate level and several years as a practicing engineer with Westinghouse Electric during which time he held the position of Supervisory Engineer responsible for design of power semiconductor devices

(Continued on Page 3, Sec. 2)

(Continued from Page 1, Sec. 2)

and later that of Program Manager of Industrial Computer Development.

In 1960, he became Associate Director for Research of the Westinghouse Central Research Laboratories, which had a staff of 600 professionals and 280 Ph. D.'s. While in this position, Dr. Bright became involved with the schools being operated by Westinghouse for pre-school children of minority groups; high school dro-outs; and juvenile delinquents.

Dr. Bright as responsible for establishing a behavioral technology department, which had a staff of 15 psychologists, to study the basic motivation of these groups. These experimental programs had rather spectacular success marked in part, by a 1½ year improvement in the reading level of the students on the basis of ½ day instruction over the period of 3 months.

In 1965, Dr. Bright was appointed to the position of Associate Commissioner of the Office of Education in Washington, D.C. While in this position, he served as Director of the Bureau of Research and had complete responsibility for all Office of Education training programs, including the research, development, demonstration and dissemination of informtion.

In 1968, Dr. Bright left the Office of Education to accept his current position as distinguished Interdisciplinary professor, OFC. of the president, of Baylor University, Waco, Texas.

Dr. Bright's professional accomplishments include numerous engineering patents; the Alfred Noble award from the Joint Engineering Societies for his paper on "Junction Transistors used as Switches;" and Chairman of the National IRE Committee on Solid State Circuitry. Dr. Bright's name appears in Who's Who in American Education and American Men of Science.

THE PAPER WITH A POLICY WILKES-BARRE ALL THE NEWS THE DAY IT HAPPENS

TIMES LEADER

PROGRESS INDUSTRY HOME BUSINESS

MONDAY EVENING, FEBRUARY 3, 1969

BY CARRIER: $1.20 EVERY TWO WEEKS

THE EVENING NEWS

10 CENTS PER COPY

Program For Educators

$240,000 Allocated For Data Process Course

Congressman Daniel J. Flood today announced Congressman Daniel J. Flood today announced Washington, D. C., has awarded a $240,000 research contract to the INTECH Corporation, 116 South Main street, Wilkes-Barre.

Project coordinators will be Patricia Brislin, president of INTECH Corporation, and Dr. Ellis Roberts, president of Wilkes-Barre Business College.

Flood said that King's College has provided a $12,300 contribution toward this data processing field testing program for educators.

The congressman said that the Project EDITS will include 60 educators from the Luzerne County area in a comprehensive data processing education program consisting of 259 class hours, laboratory sessions, plus special tutorial sessions. It will serve to provide educators with understanding of recent concepts of information, utilizing their own disciplines.

Laboratory sessions will include "hands-on" computer testing and additional testing sessions performed on a "remote" basis.

The training will include fundamentals of data processing, computing program teaching application and additional application directly to the teacher's own discipline.

This program will be provided by using a staff of 11 professional data processing personnel and seven guest lecturers drawn from industry, the academic professions and data processing.

The entire program will be completed in a 10-month period. Project EDITS have been designed to demonstrate a flexible program to be tailored to most education systems, Flood said.

Wilkes-Barre Record

WILKES-BARRE, PA., TUESDAY MORNING, FEBRUARY 4, 1969 — 20 PAGES

$240,000 Research Contract Announced

A research contract totaling $240,000 to conduct a data processing field testing program for educators has been awarded to Intech Corporation, 116 South Main Street.

Congressman Daniel J. Flood, who made the announcement yesterday, said the grant comes from Washington, D. C., and added King's College has provided a $12,300 contribution towards the program.

Project coordinators will be Patricia Brislin, president of Intech, and Dr. Ellis Roberts, president of Wilkes-Barre Business College.

Congressman Flood said the project will include 60 educators from Luzerne County area in a comprehensive data processing education program consisting of 259 class hours, laboratory sessions, plus special tutorial sessions. It will serve to provide educators with understanding of recent concepts of information, utilizing their own disciplines.

Laboratory sessions will include "hands-on" computer testing and additional testing sessions performed on a "remote" basis.

Training phase consists of fundamentals of data processing, computing program teaching application and additional application directly to the teacher's own discipline.

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SUNDAY INDEPENDENT

Luzerne County's Own
Complete Sunday Newspaper

SECOND SECTION
SUNDAY, MARCH 23, 1969

Dr. R. Louis Bright

Key Educator to Speak To 60 Local Educators

Some 60 educators from Luzerne County, who are engaged in a comprehensive data processing education program, will hear a talk tomorrow evening at King's College by Dr. R. Louis Bright, distinguished interdisciplinary professor at Baylor University.

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(Continued on Page 3, Sec. 2)

Key Education

(Continued from Page 1, Sec. 2)

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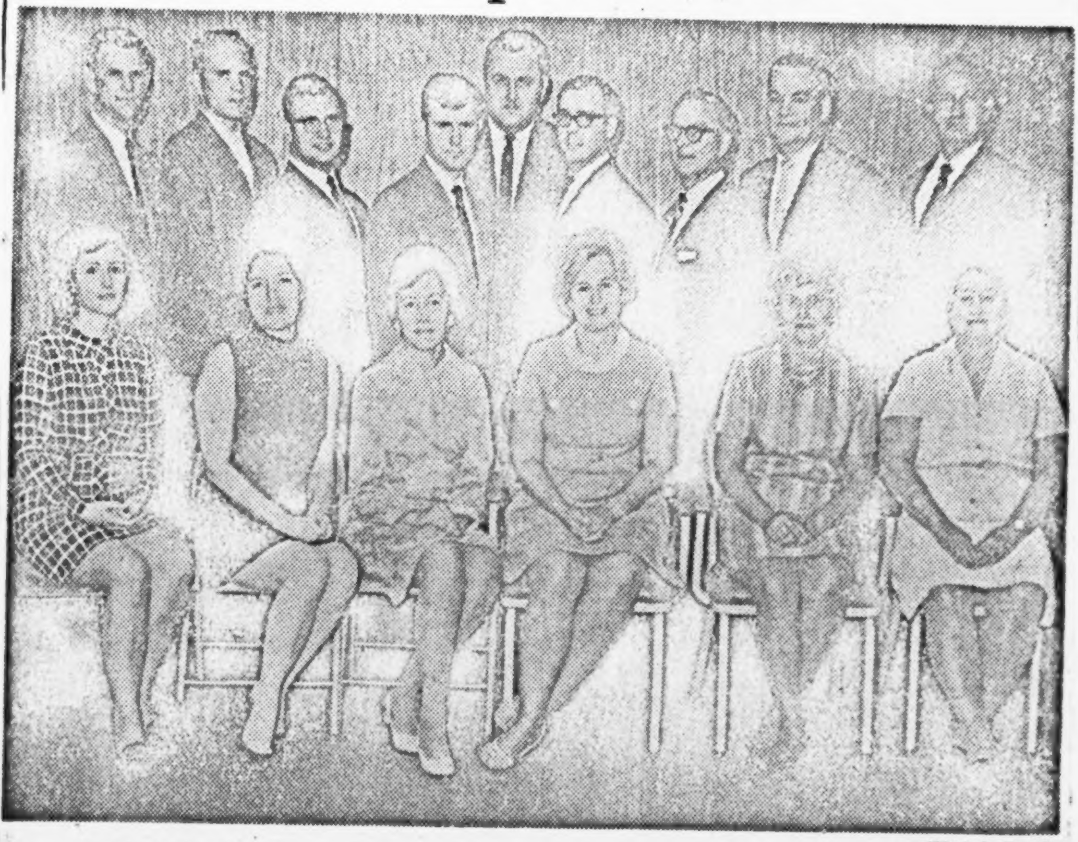
Wilkes-Barre Record SECTION

WILKES-BARRE RECORD, WEDNESDAY, OCTOBER 1, 1969

Educators Complete Course



(Photo by Broody)

InTech Corporation recently presented certificates to 15 local educators, who are reported to be the first in the nation to complete the Educators Information Technology System (EDITS).

EDITS is an innovative project in education being conducted by InTech Corporation, a local consulting firm, under the sponsorship of the U. S. Office of Education. It is designed to provide educators with a comprehensive understanding of computer technology.

Mrs. Patricia Brislin, president of InTech Corporation, presented the certificates of completion.

First of the 60 educators from upper Luzerne County, who are participating in the project, to complete the program are:

Seated, left to right: Jeanne Wells, Miriam Sable, Helen Christian, Mary A. Drobnicki, Dorothy Rother and Eva Lipiec.

Standing, left to right: Joseph Petrenchak, Arthur Hontz, Michael Elias, Henry Shemanski, George Daru, Robert Powell, Stanley Fidrych, Joseph Wazenski and Joseph Yuhas.

THE PAPER WITH A POLICY WILKES-BARRE ALL THE NEWS THE DAY IT HAPPENS
TIMES LEADER
PROGRESS · INDUSTRY · BUSINESS · HOME
WEDNESDAY EVENING, JULY 16, 1969
BY CARRIER .20 EVERY TWO WEEKS
THE EVENING NEWS
10 CENTS PER COPY

Dr. Kirchberger Reviews Program

A review of the U. S. Office of Education project being conducted at InTech Corporation was conducted by Dr. Andre Kirchberger, Paris, France, administrator of the Center of Educational Research and Innovation of the Organization for Economic Development (OECD), based in Paris, at the InTech offices at 116 South Main street, Wilkes-Barre.

The project—the Educators' Information Technology System (EDITS)—is designed to familiarize educators with computer technology and its applications to the field of education. Project is being participated in by 60 educators of upper county.

Dr. Kirchberger, who is a graduate of University of Paris in the fields of science and psychology, is visiting the United States in connection with research beng done by the Center to develop an international uniformity of computer education and computer science curriculum for educators.

OECD, with 26 member nations, is the successor to the Marshall Plan.

Wilkes-Barre Record

WILKES-BARRE, PA., WEDNESDAY MORNING, JULY 16, 1969 — 22 PAGES

Computers Discussed

Dr. Andre Kirchberger, center, Paris France, administrator of the Center of Educational Research and Innovation of the Organization for Economic Cooperation and Development, conferring last night at InTech Corporation, 116 South Main Street.

Left to right: Patricia Brislin, president of InTech Corporation; Dr. Kirchberger and Dr. R. Louis Bright, interdisciplinary professor at Baylor University, Texas.

Former French Ministry Aide Visits InTech

Computer-Education Link Surveyed by Dr. Kirchberger

Dr. Andre Kirchberger, Paris, France, administrator of the Center of Educational Research and Innovation of the Organization for Economic Cooperation and Development (OECD), based in Paris, visited Wilkes-Barre last night to review a U. S. Office of Education project being conducted at InTech Corporation, 116 South Main Street.

The project—the Educators' Information Technology System (EDITS)—is designed to familiarize educators with computer technology and its applications to the field of education. Project is being participated in by 60 educators of upper county.

Dr. Kirchberger, who is a graduate of University of Paris in the fields of science and psychology, is visiting the United States in connection with research beng done by the Center to develop an international uniformity of computer education and computer science curriculum for educators.

OECD, with 26 member nations, is the successor to the Marshall Plan.

Dr. Kirchberger has been with OECD one year and served as an officer in the French Ministry for Scientific Research.

Prior to his visit to Wilkes-Barre, Dr. Kirchberger met with top Office of Education officials in Washington, D. C., and will later review projects in other areas of the nation.

He became familiar with Project EDITS through an address given by Dr. R. Louis Bright, interdisciplinary professor at Baylor University, Texas, and former Associate Commissioner of the U. S. Office of Education, at a May meeting of OECD in Paris.

Dr. Bright, U. S delegate to the Center for Educational Research and Innovation, accompanied Dr. Kirchberger to Wilkes-Barre.

Dr. Kirchberger conferred with Patricia Brislin, president of InTech Corporation, and other members of its staff and also visited classes at the South Main Street institution.

APPENDIX O

Class Evaluation Form

COMMENTS: SECTION ____________ INSTRUCTOR ____________

DATE ______________________________

TOPICS INTENDED TO BE COVERED: ____________

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TOPICS COVERED: ____________

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STUDENT PARTICIPATION: ____________

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VISUAL AIDS: ____________

LAB PROBLEM: ____________

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ADDITIONAL: ____________

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